

# Human resources issues and Australian Disaster Medical Assistance Teams: results of a national survey of team members

Peter Aitken<sup>1,2</sup>, Peter Leggat<sup>1,3\*</sup>, Hazel Harley<sup>1,4</sup>,  
Richard Speare<sup>1</sup> and Muriel Leclercq<sup>1</sup>

<sup>1</sup>Anton Breinl Centre for Public Health and Tropical Medicine, James Cook University, Townsville, QLD, Australia; <sup>2</sup>Emergency Department, The Townsville Hospital, Townsville, QLD, Australia; <sup>3</sup>School of Public Health, University of the Witwatersrand, Johannesburg, South Africa; <sup>4</sup>Consultant, Perth, WA, Australia and formerly Public Health Division, Department of Health, Perth, WA, Australia

**Background:** Calls for disaster medical assistance teams (DMATs) are likely to continue in response to international disasters. As part of a national survey, this study was designed to evaluate Australian DMAT experience in relation to the human resources issues associated with deployment.

**Methods:** Data was collected via an anonymous mailed survey distributed via State and Territory representatives on the Australian Health Protection Committee, who identified team members associated with Australian DMAT deployments from the 2004 South East Asian Tsunami disaster.

**Results:** The response rate for this survey was 50% (59/118). Most personnel had deployed to the Asian Tsunami affected areas with DMAT members having significant clinical and international experience. While all except one respondent stated they received a full orientation prior to deployment, only 34% of respondents (20/59) felt their role was clearly defined pre deployment. Approximately 56% (33/59) felt their actual role matched their intended role and that their clinical background was well suited to their tasks. Most respondents were prepared to be available for deployment for 1 month (34%, 20/59). The most common period of notice needed to deploy was 6–12 hours for 29% (17/59) followed by 12–24 hours for 24% (14/59). The preferred period of overseas deployment was 14–21 days (46%, 27/59) followed by 1 month (25%, 15/59) and the optimum shift period was felt to be 12 hours by 66% (39/59). The majority felt that there was both adequate pay (71%, 42/59) and adequate indemnity (66%, 39/59). Almost half (49%, 29/59) stated it was better to work with people from the same hospital and, while most felt their deployment could be easily covered by staff from their workplace (56%, 33/59) and caused an inconvenience to their colleagues (51%, 30/59), it was less likely to interrupt service delivery in their workplace (10%, 6/59) or cause an inconvenience to patients (9%, 5/59). Deployment was felt to benefit the affected community by nearly all (95%, 56/59) while less (42%, 25/59) felt that there was a benefit for their own local community. Nearly all felt their role was recognised on return (93%, 55/59) and an identical number (93%, 55/59) enjoyed the experience. All stated they would volunteer again, with 88% strongly agreeing with this statement.

**Conclusions:** This study of Australian DMAT members provides significant insights into a number of human resources issues and should help guide future deployments. The preferred 'on call' arrangements, notice to deploy, period of overseas deployment and shift length are all identified. This extended period of operations needs to be supported by planning and provision of rest cycles, food, temporary accommodation and rest areas for staff. The study also suggests that more emphasis should be placed on team selection and clarification of roles. While the majority felt that there was both adequate pay and adequate indemnity, further work clarifying this, based on national conditions of service should be, and are, being explored currently by the state based teams in Australia. Importantly, the deployment was viewed positively by team members who all stated they would volunteer again, which allows the development of an experienced cohort of team members.

**Keywords:** *disaster; medical assistance; Australia; Southeast Asia; human resources; indemnity; deployment conditions; disaster medical assistance teams*

Disasters are increasing in frequency, with more than 10,000 disasters reported in the past 50 years, affecting 12 billion people and resulting in 12 million deaths (1, 2). Some large disasters will overwhelm the preparedness of any region or country, with probable calls for disaster medical assistance and humanitarian aid (3, 4). This will require the timely mobilisation of national and international resources. Disasters are also more likely to occur in developing countries (2, 5), where their effects may be more pronounced. On 26 December 2004, the South East Asian tsunami hit countries around the Indian Ocean rim, particularly around its earthquake-associated epicentre off Indonesia. The full impact of the tsunami is still being assessed years after the natural disaster, which is thought to have killed more than 250,000 people and affected millions (6). The tsunami was also a landmark event in the history of Australian disaster management, as it was the first time that organised civilian based teams, described elsewhere (7), were deployed under the Australian Assist Plan (AUSASSISTPLAN) (8). The agencies responsible for the organisation of DMATs have dual accountabilities. They need to provide the most effective response based on the needs of the affected community, while also ensuring the welfare, health and safety of those deployed, whether employees, contract workers or volunteers. It is, therefore, essential that staff deployed to provide disaster assistance not only have the appropriate backgrounds and expertise but human resources issues, such as deployment period, shift length, remuneration, insurance and indemnity have been properly addressed.

Much of the literature concerning DMATs, including the Australian DMAT experience (9–16), consists of individual team reports, which are often anecdotal. The lack of standards for DMATs has also made in-depth evaluation difficult for both an external reviewer and team members. Hence, there have been few studies examining DMAT deployments and few dedicated studies of DMAT members in Australia. The present survey was part of a national program evaluating the Australian DMAT experience and examining potential models for future use in Australia. The survey was undertaken in order to target the existing Australian DMAT experience base and both explore and identify issues raised by these groups. The experience base primarily includes those individuals actually deployed ‘on the ground’, and this aspect of the survey explores the human resources issues associated with their deployment.

## Methods

The methods for this study have been described elsewhere (7). Briefly, all team members associated with Australian

DMAT deployments from the 2004 South East Asian Tsunami disaster were surveyed via their State/Territory jurisdictions. Representatives of the AHPC through their State and Territory jurisdictions identified 118 DMAT personnel and mailed out questionnaires on our behalf. The human resources component of the survey itself constituted 25 questions. This was grouped as two sections which consisted of four questions in which respondents were asked to select an option related to time periods of deployment or shift length (all with opportunity for other response) and 19 Likert scale responses. There was also space provided for additional comment in each section. Data was also collected on demographic details. No follow-ups were undertaken due to conditions placed on the study by the ethics approval. Our study protocol was reviewed and approved by the James Cook University Human Research Ethics Committee in 2006 (Approval No. H2464). The support of the Commonwealth Australian Health Protection Committee (AHPC) was also sought and given for the survey. Data was entered into a spreadsheet program and analysed using the Statistical Package for the Social Sciences (Version 14.0, SPSS, 2006). Descriptive statistics were used, as the sample was relatively small.

## Results

The overall response rate for this survey was 50% (59/118). The demographic details of the respondents have been given elsewhere (7). Survey responses are described in Table 1.

Approximately 58% (34/59) of those responding stated they had significant experience in international disasters before deployment. All except one respondent stated they received a full orientation prior to deployment. Despite this only 34% of respondents (20/59) felt their role was clearly defined pre deployment although approximately 56% (33/59) felt their actual role matched their intended role.

While 49% (29/59) stated it was better to work with people from the same hospital, only 12% (7/59) felt it was better to work with people from the same state. The majority felt that there was both adequate pay (71%, 42/59) and adequate indemnity (66%, 39/59). All stated they would volunteer again, with 88% strongly agreeing with this statement.

Most respondents were prepared to be available for deployment for 1 month (34%, 20/59), once placed on standby, while equal numbers were prepared to be available for two weeks (22%, 13/59) or longer than 3 months (22%, 13/59). Seven (12%) were only prepared to be available for one week and one person for 1 day. Five preferred unspecified other time periods. The notice

**Table 1.** Levels of agreement of statements concerning human resources issues

Statement	1	2	3	4	5	Not applicable/missing
	Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree	
I had significant experience in disaster management before deployment	15 (25%)	33 (56%)	1 (2%)	3 (5%)	–	–
I had significant experience in international disasters before deployment	6 (10%)	12 (20%)	6 (10%)	14 (24%)	20 (34%)	–
My role was clearly defined pre deployment	14 (24%)	22 (37%)	3 (5%)	11 (19%)	9 (15%)	–
My actual role matched my intended role	3 (5%)	15 (25%)	8 (14%)	21 (36%)	12 (20%)	–
My clinical background was well suited to my tasks	3 (5%)	11 (19%)	8 (14%)	20 (34%)	13 (22%)	4 (7%)
I received a full orientation prior to deployment	–	1 (2%)	–	19 (32%)	33 (56%)	6 (10%)
It is better to work with people from the same hospital	4 (7%)	16 (27%)	10 (17%)	20 (34%)	9 (15%)	–
It is better to work with people from the same State	6 (10%)	17 (29%)	19 (32%)	5 (8%)	2 (3%)	10 (17%)
There was adequate pay	2 (3%)	7 (12%)	6 (10%)	29 (49%)	13 (22%)	2 (3%)
There was adequate indemnity	1 (2%)	4 (7%)	14 (24%)	23 (39%)	16 (27%)	1 (2%)
My deployment was able to be easily covered by staff from my workplace	–	13 (22%)	12 (20%)	25 (42%)	8 (13%)	–
My deployment caused an inconvenience to colleagues	4 (7%)	12 (20%)	13 (22%)	26 (44%)	4 (7%)	–
My deployment caused an inconvenience to patients	8 (13%)	23 (39%)	10 (17%)	4 (7%)	1 (2%)	12 (20%)
My deployment interrupted the ability to provide a clinical service in my workplace	7 (12%)	25 (42%)	10 (17%)	2 (3%)	4 (7%)	11 (19%)
My deployment benefited the affected local community	–	1 (2%)	2 (3%)	23 (39%)	33 (56%)	–
My deployment benefited my local community	1 (2%)	4 (7%)	29 (49%)	20 (34%)	5 (8%)	–
I enjoyed the experience	–	–	4 (7%)	11 (18%)	44 (75%)	–
My role in the deployment was recognised on return	1 (2%)	3 (5%)	–	28 (47%)	27 (46%)	–
I would volunteer again	–	–	–	7 (12%)	52 (88%)	–

needed to deploy ranged from less than 6 hours for 22% (13/59) to 3 days for a similar number (22%, 13/59). The most common period stated was 6–12 hours by 29% (17/59) followed by 12–24 hours for 24% (14/59). Twenty-seven respondents (46%) stated the optimum period of overseas deployment to be 14–21 days followed by 1 month for 15 (25%), 10–14 days by eight (14%) and 7–10 days by one (2%). Eight respondents (14%) preferred deployments longer than 1 month. The optimum shift period was felt to be 12 hours by 66% (39/59) and 8 hours by 22% (13/59). One person preferred 24 hour shifts, two preferred unstated ‘other length’ shifts and four did not respond to this question.

## Discussion

This study represented the first national survey of Australian DMAT members deployed to date. The experiences of these deployed professionals in relation to the human resources issues related to their deployment have been sought and the findings need to be incorporated as part of future planning and preparedness. This is particularly relevant as the Australian Government

continues to develop an Australian Medical Assistance Teams (AUSMAT) program (17), with recent deployments to Samoa, Pakistan and New Zealand.

This study of the Australian DMAT experience found that although team composition was varied, health professional membership was consistent with that described by other authors (18). The DMAT members had significant clinical and international experience, although most had little or no experience in disaster management.

### *Clinical background, role and team selection*

An essential human resources issue is team selection, which must be tailored to meet the specific needs of the affected community (19) and based on a full understanding of the type of disaster and expected injury patterns (20–22). Central to this is the clinical background of team members and roles in deployment. The importance of team structure (15) and team member selection (9, 15) has been noted previously in reports of Australian DMAT activity with team success very much dependent on the selection of the right person for a specific job crucial in both normal and emergency

situations (23). Despite nearly all receiving an orientation pre-deployment there were concerns expressed in this study by team members who did not feel their clinical background was well suited to their tasks, their role was not clearly defined pre deployment or that their actual role did not match their intended role. While this may reflect planning and team selection issues, it should also be noted that, for early deployments, there was little time available for full orientation to occur and that needs change rapidly.

To be effective, teams need to be multidisciplinary, have the appropriate training, and have predefined strategies for how to carry out these tasks. While planning should aim to keep roles as close as possible to the respondents' usual daily duties (24), those selected should also have as broad a base of experience and expertise as possible to increase their value and ability to work in a variety of situations (25), with flexibility the key. Administrative staff should also be health professionals who can serve two or more roles in a deployment (26). There also needs to be a clear understanding of all team members' roles and responsibilities, and how they contribute to the overall objectives (27). Job identification and responsibility are essential for staff morale, with team cohesiveness helping them better withstand prolonged exposure to the stresses generated by the disaster (28). A review of the coping mechanisms of health care teams in Thailand following the tsunami, found those who had volunteered for teams, were found to be more supportive of other team members, than those simply asked to work with teams. This was thought to reflect the contribution of positive attitude towards motivation and team function. In this study most respondents had been asked to go (28). Selection should also not be based entirely on skills; fitting into a team and being able to carry out the work required in the field is more desirable (29), reinforcing the need for pre-deployment screening of both physical and psychological health (30).

The selection process needs to be rigorous and complete. In the US example, people wishing to become NDMS team members need to complete a federal application, submit to background checks, maintain their professional credentials, be able to physically perform their assigned job, and comply with training requirements. The social and personal impact of deployment is considered in even more detail by some organisations which have found having partners attend an introduction day where they gain an understanding of the commitment and dangers may eliminate a number of applicants (29). Organisations need to be sure that volunteers have considered the effects of deployment on themselves, their home life and career; conditions of work in the field; support and funding; any issues of conscience and what it will be like returning home (29, 31).

### *Experience*

Unfortunately, the majority of people responding to international disasters may be novices who volunteer for short periods then return to their normal occupations without passing on their experiences (32). The growing need for disaster relief work and a rapid response has led many organisations to place inexperienced or inadequately trained personnel in the field. Such inexperienced but enthusiastic workers may be of limited or decreasing usefulness (33), and may even have a negative impact as such personnel can threaten the success of a program, frustrate beneficiaries and donors, and damage the credibility of the agency (34). The Tsunami Evaluation Coalition made note of the lack of career structure in general for international relief work which encourages this high staff turnover, general shortage of relevant expertise and recruitment of inexperienced personnel (35). The development of future models should seek to develop and retain the core of experience developed from previous deployments.

### *Local and state based teams*

The preference in this survey was to work with people from the same hospital rather than simply with people from the same state. Reasons for this were not explored but there are obvious team advantages with established working relationships. Each US DMAT has a sponsoring organisation, such as a major medical centre (18, 31). This means US DMATs may serve two different functions. They act as a local resource to the institution sponsoring them, and can also be activated as a federal reserve (26). There can, however, be problems with availability if all staff come from one institution. Even a hospital the size of Massachusetts General has found constraints with the ability to cover staff deployment (36, 37), while both staff availability, and ability to cover their absence, has also been an issue for the US military (37). Having a regional base for team membership may spread deployment load, help maintain local service delivery and increase response capability through a jurisdiction and allow enhanced intra-jurisdictional response if the primary institution is affected. Ease of access to ongoing training programs, through geographic proximity, should still enable relationship and team building to occur.

### *Period of availability and notice*

Most respondents were prepared to be available for deployment, once put on notice, for 1 month, which is consistent with the US DMAT experience (31). Rotating call periods are essential to cover leave and existing work commitments. Although local people provide the first response, there may still be a need to respond quickly once activated (25), depending on the role of the deployment. Teams need to have a response structure and



strategy in place that can be activated immediately (38), which includes all team members having current passports (25). The notice needed to deploy in this survey ranged from less than 6 hours to 3 days, with the most common period required being 6–24 hours. There are also inherent delays in activation given the request for aid must travel through pre-established diplomatic channels once the affected country has determined that its own resources have been overwhelmed or destroyed (5, 25). While this takes time, ‘shortcutting’ this procedure may have unwanted consequences including perceived invasion, incarceration of relief staff, and political repercussions (25). Teams and individuals who respond to disasters without authority or accreditation will only add to the problems of the affected country, further draining their resources (38).

### *Period of deployment and shift length*

Redmond et al. note that, after 5 days on scene, both mental and physical exhaustion can set in, reducing the effectiveness of the team and increasing the risk to patients. A strict rule to disengage after 5 days was used by their Manchester based team and had to be accepted by the team before departing (39). In contrast, the preferred period of deployment in this survey was 14–21 days with longer periods of deployment such as 1 month or longer also preferred to shorter periods of deployment.

This longer deployment period mandates a need for extended operation planning (40) and development of measures to minimise both physical and mental fatigue (41). This includes the provision of rest cycles, short breaks, food, temporary accommodation and rest areas for staff as an aid to management of stress and morale (40). Leisure time activities are also often limited due to safety concerns, power shortages, curfews, transport difficulties and the closure of local businesses (42). Rest breaks may need to be enforced as the temptation is for off duty staff to ‘hang around’ (18, 27, 41), with rest often difficult when teams work in 12-hour shifts as preferred by respondents in this study.

### *Funding and indemnity*

The funding model has a great influence on the scope of the project (27). Significant expenditure can be anticipated and will vary according to the type, extent and magnitude of the disaster, the number of people sent, the type and amount of equipment, and the length of time deployed, while team members also need to have job security and medico-legal indemnity (25). While most felt that there was both adequate pay and adequate indemnity this needs to be predetermined with funding, insurance and indemnity issues resolved before deployment, including guidelines on what will be funded on deployment and policy developed on use of cash

advances and credit card use (16). National conditions of service would also aid inter operability of state based teams (15).

The US approach of ‘federalising’ DMAT members for operational deployment eliminates a number of potential problems, including licensing issues (18, 31, 43, 44), liability (31), insurance coverage (43, 33), and wage guidelines (18). Although training is usually voluntary (44), they are treated as Federal employees for the duration of duty, so their expenses are met, and they are paid or have their normal salaries reimbursed by the US Public Health Office (31, 45). This also means they have the protection of the Federal Tort Claims Act, in which the Federal Government becomes the defendant in the event of an interstate malpractice claim (31). In return, DMAT members are required to maintain appropriate certification and licensing within their discipline (31, 45). This option has since been explored by some state based AUSMAT in Australia, including Western Australia, which now has position numbers within the human resource system to enable all AUSMAT members to become short term state health department employees to address these issues whilst on deployment.

Deployment was felt to benefit the affected community by nearly all, while less felt that there was a benefit for their own local community. This is a reflection of the direct and tangible benefits provided to the affected community versus indirect and intangible benefits for the donor community. Nearly all felt their role was recognised on return, they enjoyed the experience and would volunteer again. This is important as it aids retention of an experienced cohort and when supported by an appropriate policy framework and database assists future deployment of teams most likely to add value to the affected region.

This study represented an analysis of data collected on a cross-sectional survey of Australian DMAT members. There was a 50% response overall, but a limited response from some states, particularly New South Wales and Victoria, suggested coverage concerns. The inability to undertake follow-ups, due to ethics limitations, may also have contributed to the poor response in these jurisdictions. Of the seven teams deployed, four were mixed state teams and three were single state teams with four deployed initially and three up to 1 month later. The five-person team deployed to Sri Lanka and was most at risk of not being represented. This is offset to some degree by the overall response rate, small size of that team, other teams being deployed in the same response phase, levels of experience amongst responders and the representative mix of disciplines. The use of self reported data and the inherent limitations of this are also acknowledged. Hence, although generalisation and extrapolation of this data will therefore be limited, the data can be

useful in developing a more effective response to deployment health of members of future DMATs.

## Conclusions

This study of Australian DMAT members provides significant insights into a number of human resources issues and should help guide future deployments. The preferred 'on call' arrangements were for periods of 1 month while the majority needed between 6 and 24 hours notice to deploy. The preferred period of overseas deployment was 14–21 days with 12-hour shifts. This extended period of operations needs to be supported by planning and provision of rest cycles, food, temporary accommodation and rest areas for staff. While uncertainty is inherent in this style of deployment, the study also suggests that more emphasis should be placed on team selection and clarification of roles. Only 34% felt their role was clearly defined pre-deployment and 24% felt their clinical background was not well suited to their tasks. Working with others from the same hospital was preferred to state, regional or national based teams, and, although respondents acknowledged the inconvenience their deployment caused to their colleagues, they did not feel it interrupted service delivery or inconvenienced patients. While the majority felt that there was adequate pay and adequate indemnity, further work clarifying this based on national conditions of service should be, and are, being explored currently by the state based teams in Australia and the Australian Health Protection Committee. Importantly, the deployment was viewed positively by team members who all stated they would volunteer again, which allows the development of an experienced cohort of team members.

## Acknowledgements

We would like to thank the AHPC for endorsing and assisting with our survey. We also wish to thank Dr Andrew Robertson for his advice concerning this project. We would also like to express our appreciation to all DMAT members who responded to our survey and also acknowledge the support of Dr Frances W. Leggat for her data coding and entry.

## Conflicts of interest and funding

This research was funded by the Public Health Education and Research Program, Department of Health and Ageing, Commonwealth of Australia. The first author is supported by a Noel Stevenson Fellowship, from the Queensland Emergency Medicine Research Foundation. The authors have not received any other funding or benefits from industry to conduct this study and have no conflicts of interest.

## Dedication

The authors wish to dedicate this research to the thousands of people affected by the South East Asian tsunami and Yogyakarta earthquake, as well as those affected by recent events in Samoa, Pakistan, New Zealand and Japan.

## References

1. Centre for Research on the Epidemiology of Disasters (CRED). Emergency Events Database (EM-DAT). 2009; [downloaded 2011 March 11]. Available from: <http://www.emdat.be>.
2. International Federation of Red Cross and Red Crescent Societies (IFRC). World Disasters Report 2007. Geneva: International Federation of Red Cross and Red Crescent Societies; 2008.
3. Russbach R. International assistance operations in disaster situations. *Prehospital Disaster Med.* 1990;5:247–9.
4. Dara SI, Ashton RW, Farmer JC, Carlton PK. Worldwide disaster medical response: an historical perspective. *Crit Care Med.* 2005;33:2–6.
5. Haddow GD, Bullock JA. International disaster management. In: Haddow GD, Bullock JA, editors. *Introduction to emergency management*. Philadelphia: Butterworth Heinemann; 2003. p. 165–200.
6. Bloom S. Tsunami threats: the long and short of it. *J Clin Invest.* 2005;115:481.
7. Aitken P, Leggat PA, Harley H, Speare R, Leclercq M. Logistic support provided to Australian Disaster Medical Assistance Team members: results of a national survey. *Emerg Health Threats J.* 2012;5:9750.
8. Templeman D. Operation Tsunami assist. *Aust J Emerg Manag.* 2004;19:2–3.
9. Bridgewater FH, Aspinall ET, Booth JP, Capps RA, Grantham HJM, Pearce AP, et al. Team Echo: observations and lessons learned in the recovery phase of the 2004 Asian tsunami. *Prehospital Disaster Med.* 2006;21:20–5.
10. Byleveld PM, Kent MI, McCall BJ. Operation Sumatra Assist: post-tsunami environmental and public health response in Banda Aceh. *Aust Def Force Health.* 2006;6:48–53.
11. Cooper DM. 'Operation Tsunami Assist'—Australian civilian medical team deployment. *Prehospital Disaster Med.* 2005; 20:113–4.
12. Garner AA, Harrison K. Early post tsunami disaster medical assistance to Banda Aceh: a personal account. *Emerg Med Australas.* 2006;18:93–6.
13. Grantham H. Southeast Asian tsunami—Australian ECHO team response. *Prehospital Disaster Med.* 2005;20:114.
14. Jackson A, Little M. On the ground in Nias in response to an earthquake—an emergency team's experience. *Emerg Med Australas.* 2006;18:199–202.
15. Pearce A, Mark P, Gray N, Curry C. Responding to the Boxing Day tsunami disaster in Aceh, Indonesia: Western and South Australian contributions. *Emerg Med Australas.* 2006;18:86–92.
16. Robertson AG, Dwyer DE, Leclercq MG. Operation South East Asia Tsunami Assist: an Australian team in the Maldives. *Med J Aust.* 2005;182:340–2.
17. South Australian Department of Health. Australian Medical Assistance Team (AusMAT). 2007; [downloaded 2012 March 11]. Available from: <http://www.health.sa.gov.au/Default.aspx?tabid=128>.
18. Wallace AG. Ch. 13. National disaster medical system: disaster medical assistance teams. In: Hogan DE, Burstein JL, editors.

- Disaster medicine. Philadelphia: Lippincott Williams and Wilkins; 2002. p. 133–42.
19. VanRooyen M, Eliades MJ, Grabowski JG, Stress ME, Juric J, Burkle FM. Medical relief personnel in complex emergencies: perceptions of effectiveness in the former Yugoslavia. *Prehospital Disaster Med.* 2001;16:104–8.
  20. Griekspoor A, Sondorp E. Enhancing the quality of humanitarian assistance: taking stock and future initiatives. *Prehospital Disaster Med.* 2001;16:209–15.
  21. Milsten A. Hospital responses to acute onset disasters: a review. *Prehospital Disaster Med.* 2000;15:32–45.
  22. Noji EK. The public health consequences of disasters. *Prehospital Disaster Med.* 2000;15:147–57.
  23. Cuny FC. Principles of disaster management lesson 11: personnel evaluation. *Prehospital Disaster Med.* 2000;16:62–7.
  24. Kizer KW. Lessons learned in public health emergency management: personal reflections. *Prehospital Disaster Med.* 2000;15:209–14.
  25. Abrams T. The feasibility of prehospital medical response teams for foreign disaster assistance. *Prehospital Disaster Med.* 1990;5:241–6.
  26. Moore S, Blasser E. A new look at disaster medical assistance teams. *Mil Med.* 1991;156:543–6.
  27. Birch M, Miller S. Humanitarian assistance: standards, skills, training and experience. *BMJ.* 2005;330:1199–201.
  28. Bar-Dayana Y, Rami P, Issac A, Ofer S, Shvarts D, Guy N, et al. Support factors of the healthcare teams in affected areas of Thailand during the disaster medical response—lessons learned from the 26th December 2004 tsunami. *Prehospital Disaster Med.* 2005;20:119–20.
  29. Holland J, Wooster P. International rescue team: selection and training. *Crisis Response J.* 2004;1:51–4.
  30. Aitken P, Leggat P, Robertson A, Harley H, Leclercq M, Speare R. Pre and post deployment health support provided to Australian Disaster Medical Assistance Team members: results of a national survey. *Travel Med Inf Dis.* 2009;7:305–11.
  31. Force Health Protection and Readiness Program. National Disaster Medical System. April 29, 2010; [downloaded 2012 March 11]. Available from: <http://ndms.fhpr.osd.mil/>.
  32. Birnbaum ML. Professionalisation and credentialing. *Prehospital Disaster Med.* 2005;20:210–1.
  33. Moresky RT, Eliades MJ, Bhimani MA, Bunney EB, VanRooyen MJ. Preparing international relief workers for health care in the field: an evaluation of organisational practices. *Prehospital Disaster Med.* 2001;16:257–62.
  34. Brennan RJ, Nandy R. Complex humanitarian emergencies: a major global health challenge. *Emerg Med.* 2001;13:147–56.
  35. Telford J, Cosgrove J, Houghton R. Joint evaluation of the international response to the Indian Ocean tsunami: synthesis report. London: Tsunami Evaluation Coalition; 2006 [downloaded 11 March 2012 March 11]. Available from: [http://www.undp.org.in/sites/default/files/reports\\_publication/tsunamievaluationreport.pdf](http://www.undp.org.in/sites/default/files/reports_publication/tsunamievaluationreport.pdf).
  36. Wong W, Brandt L, Keenan E. Massachusetts General Hospital participation in Operation Unifed Assistance for tsunami relief in Banda Aceh, Indonesia. *Mil Med.* 2006;171:37–9.
  37. Timboe HL. Project Hope volunteers and the Navy Hospital Ship Mercy. *Mil Med.* 2006;171:34–6.
  38. Holland J, Wilson-North M. International rescue team part II: response requirements. *Crisis Response J.* 2005;1:50–3.
  39. Redmond AD, Watson S, Nightingale P. The South Manchester Accident Rescue team and the earthquake in Iran, June 1990. *BMJ.* 1991;302:1521–3.
  40. Lee FCY, Goh SH, Wong HP, Anantharam V. Emergency department organisation for disasters: a review of emergency department disaster plans in public hospitals of Singapore. *Prehospital Disaster Med.* 2000;15:20–31.
  41. Nocera A. Prior planning to avoid responders becoming ‘victims’ during disasters. *Prehospital Disaster Med.* 2000;15:46–8.
  42. Cohen SS, Mulvaney K. Field observations: disaster medical assistance team response for Hurricane Charley, Punta Gorda, Florida, August 2004. *Disaster Manag Response.* 2005;3:22–7.
  43. Roth PB, Gaffney JK. The federal response plan and disaster medical assistance teams in domestic disasters. *Emerg Med Clinics N Amer.* 1996;14:371–82.
  44. Stopford BM. The National Disaster Medical System—America’s medical readiness force. *Disaster Manag Response.* 2005;3:53–6.
  45. Born CT, DeLong WG. Organising the orthopaedic trauma association mass casualty response team. *Clin Orthop Relat Res.* 2004;422:114–6.

---

**\*Peter Leggat**

School of Public Health, Tropical Medicine  
and Rehabilitation Sciences  
James Cook University  
Townsville  
QLD 4811  
Australia  
Tel: +61 7 47815335  
Fax: +61 7 47815254  
Email: [peter.Leggat@jcu.edu.au](mailto:peter.Leggat@jcu.edu.au)