



## Responding to Typhoon Haiyan in the Philippines

### *Editorial*

#### **Responding to Typhoon Haiyan in the Philippines**

*McPherson M, Counahan M, Hall JL*

1

### *Perspective*

#### **Is the response over? The transition from response to recovery in the health sector post-Typhoon Haiyan**

*Gocotano A, Geroy LS, Alcido MR, Dorotan MM, Balboa G, Hall JL*

5

### *Brief Reports*

#### **Can you help me write my story? The institutional affiliation of authors of international journal articles on post-disaster health response**

*Gocotano A, Counahan M, Belizario V, Hartigan-Go K, Balboa G, Go M, Dayrit M, Hall JL*

10

#### **Guidelines and training for maternal and newborn care post-Haiyan**

*Kitong J, Calibo A*

15

#### **Use of the WHO Package of Essential Noncommunicable Disease Interventions after Typhoon Haiyan**

*Martínez RE, Quintana R, Go JJ, Villones MS, Marquez MA*

18

#### **Surveillance for and issues relating to noncommunicable diseases post-Haiyan in Region 8**

*Martínez RE, Quintana R, Go JJ, Marquez MA, Kim JK, Villones MS, Salazar MA*

21

#### **Managing surge staff and resources at the WHO Representative Office in the Philippines after Typhoon Haiyan**

*Urquico R, Laviña HR, Counahan M, Hall JL*

25

#### **Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan**

*Peiris S, Buenaventura J, Zagaria N*

29

### *Field Investigation Reports*

#### **An assessment of disaster-related mortality post-Haiyan in Tacloban City**

*Ching PK, de los Reyes VC, Sucaldito MN, Tayag E*

34

#### **Rapid health assessments of evacuation centres in areas affected by Typhoon Haiyan**

*Ramos RA, de los Reyes VC, Sucaldito MN, Tayag E*

39

#### **Management of the dead in Tacloban City after Typhoon Haiyan**

*Ballera JE, de los Reyes VC, Sucaldito MN, De Guzman A, SyL Jr, Zapanta MJ, Avelina F, Feliciano J, Tayag E*

44

#### **Assessment of drinking-water quality post-Haiyan**

*Magtibay B, Anarna MS, Fernando A*

48

#### **Responding to the health and rehabilitation needs of people with disabilities post-Haiyan**

*Benigno MR, Kleinitz P, Calina L, Alcido MR, Hall JL*

53

#### **The prevention and control of dengue after Typhoon Haiyan**

*Aumentado C, Cerro BR, Olobia L, Lee-Suy L, Reyes A, Kusumawathie PHD, Sagrado M, Hall JL, Abeyasinghe R, Foxwell AR, Vestergaard LS*

60

(continued on next page)

**Which surveillance systems were operational after Typhoon Haiyan?** 66

*Tante S, Villa E, Pancho A, Galvan MA, Corpuz A*

**An assessment of the case notification system 16 months after Typhoon Haiyan in Region 8, the Philippines** 71

*Gallardo FDL, de los Reyes VC, Sucaldito MN, Tayag E,*

**A snapshot of catastrophic post-disaster health expenses after Typhoon Haiyan** 76

*Espallardo NL, Geroy LS, Villanueva R, Gavino R, Nievera LA, Hall JL*

**Medicines management in the Philippine public sector during the response to Haiyan** 82

*Salenga R, Robles Y, Loquias M, Capule F, Guerrero AM*

*Lessons from the Field*

**Social media as risk communication tool following Typhoon Haiyan** 86

*Cool CT, Claravall MC, Hall JL, Taketani K, Zepeda JP, Gehner M, Lawe-Davies O*

**Restarting the tuberculosis programme post-Haiyan** 91

*Lew W, Vianzon R, Garfin AMC, Hall JL*

**Is my drinking a problem? A community-based alcohol intervention programme post-Haiyan in Tacloban City** 96

*Czaicki AE, Fabrigas G, Gocotano A, Hall JL*

---

**Western Pacific Surveillance and Response**

*Open access journal with continuous publication*

Western Pacific Surveillance and Response (WPSAR) is an open access journal dedicated to the surveillance of and response to public health events. The goal of the journal is to create a platform for timely information sharing both within our region and globally to enhance surveillance and response activities. WPSAR is a continuous publication which means articles will be published online as soon as they have completed the review and editing process. Every three months articles will be batched for a print issue. It is a publication managed by the World Health Organization Regional Office for the Western Pacific.

---

**Copyright notice**

© World Health Organization 2010

p-ISSN: 2094-7321

e-ISSN: 2094-7313

All rights reserved. The information presented in the various pages of this journal is issued by the World Health Organization for general distribution, and is protected under the Berne Convention for the Protection of Literature and Artistic Works, under national laws on copyright and neighbouring rights.

The World Health Organization does not warrant that the information contained in this publication is complete and correct and shall not be liable for any damages incurred as a result of its use.

Publications of the World Health Organization can be obtained from Marketing and Dissemination, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; email: [bookorders@who.int](mailto:bookorders@who.int)). Requests for permission to reproduce WHO publications, in part or in whole, or to translate them – whether for sale or for non-commercial distribution – should be addressed to Publications, at the above address (+41 22 791 4806; email: [permissions@who.int](mailto:permissions@who.int)). For WHO Western Pacific Regional Publications, request for permission to reproduce should be addressed to Publications Office, World Health Organization, Regional Office for the Western Pacific, P.O. Box 2932, 1000, Manila, Philippines, fax: +632 521 1036, email: [publications@wpro.who.int](mailto:publications@wpro.who.int).

**Disclaimer**

The designations employed and the presentation of the information in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

---

**EDITORIAL TEAM**

Ailan Li

*Executive Editor*

Cheng Ka Yeung

*Coordinating Editor*

Michelle McPherson

*Special Issue Editor*

Elizabeth Mangali

*Assistant Editor*

*Associate Editors*

Frank Konings

Ying-Ru Lo

Dapeng Luo

Jorge Mendoza Aldana

Nobuyuki Nishikiori

Manju Rani

Boris Pavlin

# Responding to Typhoon Haiyan in the Philippines

Michelle McPherson,<sup>a</sup> Megan Counahan<sup>b</sup> and Julie Lyn Hall<sup>b</sup>

Correspondence to WPSAR@wpro.who.int.

The Philippines is a disaster-prone country,<sup>1</sup> ranked as the second highest country worldwide at risk of natural disasters.<sup>2</sup> On 8 November 2013, Typhoon Haiyan (local name “Yolanda”) made landfall in the Philippines and had significant impact (**Box 1**).<sup>3</sup> It was the strongest typhoon to have ever made landfall in the western North Pacific Ocean with a storm surge of 5–6 metres.<sup>4</sup> Typhoon Haiyan left a corridor of destruction across the Philippines (**Figure 1**) and affected the lives of 16 million people, devastated a health system and challenged every sector of the country.<sup>3</sup> Regions 6, 7 and 8 – Western, Central and Eastern Visayas – were the most affected (**Figure 1**).

As a result of Typhoon Haiyan, a national state of calamity was declared by the President of the Philippines on 11 November 2013, and the Inter-Agency Standing Committee rated it as a Level 3 emergency.<sup>5</sup> For the first time, the World Health Organization (WHO) graded an event as a Level-3 emergency according to their Emergency Response Framework.<sup>6</sup> The resulting response was immense, and involved both national and international support. The Health Cluster was co-led by the Philippines Department of Health (DOH) and the WHO Representative Office in the Philippines. Key efforts of the Health Cluster included:<sup>7</sup>

- coordination of over 150 foreign medical teams that conducted approximately 20 000 consultations and more than 5000 surgeries;
- delivery of over 500 tonnes of medical equipment and supplies;
- training of health care workers in key areas – 300 in disease surveillance, 300 in maternal and child health (90 on Essential Intrapartum Newborn Care and 206 on Kangaroo Mother Care), 330 in mental health (200 community

## Box 1. Impact of Typhoon Haiyan in the Philippines<sup>3</sup>

- Around 3.4 million families (16 million individuals) were affected across 12 139 villages/communities in 44 provinces, 591 municipalities and 57 cities across Regions 4A, 4B, 5, 6, 7, 8, 10, 11 and Caraga.
- There were 6293 individuals reported dead, 28 689 injured and 1061 still missing.
- A reported 890 895 families (4 million individuals) were displaced. Of these 21 000 families (100 000 individuals) were served inside evacuation centres.
- There were 1.1 million damaged houses of which 551 000 were totally damaged, and the rest were partially damaged.
- The total cost of damages has been estimated at US\$ 864 million with US\$ 435 million for infrastructure and US\$ 440 million for agriculture in affected regions.
- There were 600 health facilities damaged.
- In Tacloban City, the capital of Leyte province, more than 1600 m<sup>2</sup> of debris and garbage have been cleared.

workers in psychosocial first aid and 130 health professionals in the Mental Health Gap Action Programme), 340 in water quality and 215 in waste management;

- a vaccination campaign across affected the areas conducted in November 2013 vaccinated 108 783 children against measles and 49 902 for poliovirus; and
- replacing the equipment to restart the rabies vaccination campaign across the Eastern Visayas region, including over 60 000 dog vaccines and 5000 vaccine carriers.

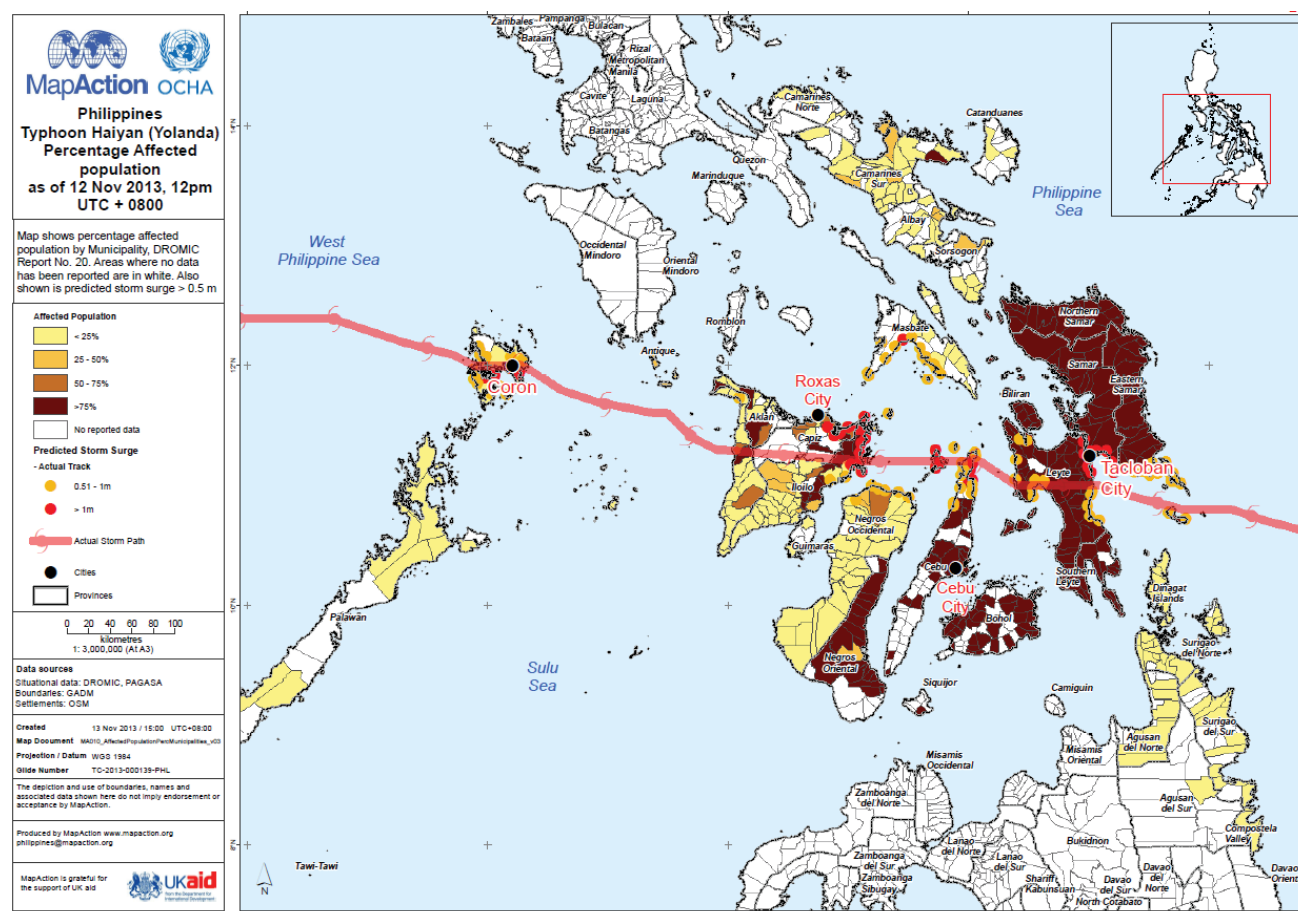
<sup>a</sup> Western Pacific Surveillance and Response Journal, Division of Health Security and Emergencies, World Health Organization Regional Office for the Western Pacific, Manila, Philippines.

<sup>b</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.4.HYN\_026

Figure 1. Pathway of Typhoon Haiyan and the percentage of affected population by municipality, the Philippines, 12 November 2013<sup>3</sup>



In this issue of the *Western Pacific Surveillance and Response Journal* (WPSAR), we provide a summary of the health response to Haiyan through 20 articles. As described in the brief report by Gocotano et al.,<sup>8</sup> 18 months after Haiyan, the WHO Representative Office in the Philippines and the DOH wanted to document the lessons learned from Haiyan. WPSAR was pleased to be involved with this project, as it matched with the aim of building capacity in communicating epidemiological and operational research within the WHO Western Pacific Region. It will hopefully contribute to reversing the trend of authors from outside disaster-affected countries publishing manuscripts about events.<sup>8</sup>

This Typhoon Haiyan issue starts with a perspective article about the transition period from response to recovery; it argues that the transition period for Haiyan occurred from three to seven months post-Haiyan and was an overlap of different activities among health sector responders.<sup>5</sup>

Following Haiyan, many existing health programmes in the Philippines required rebuilding, and in some cases, they were improved. The tuberculosis programme had to locate and facilitate treatment for existing patients and restore diagnostic capabilities; this was accomplished within two months.<sup>9</sup> New guidelines for maternal and newborn care following emergencies and disasters were developed and used extensively, including implementing Kangaroo Mother Care in 15 health facilities.<sup>10</sup> Increased coordination of services for people with disability improved beyond pre-Haiyan levels, demonstrating that it is possible to “build back better” after the response to a disaster.<sup>11</sup> Health system recovery for noncommunicable diseases (NCDs) in Region 8 was based on the WHO Package of Essential Noncommunicable Disease Interventions and resulted in trained health service providers; availability of essential equipment, supplies and medicines; functional referral systems; and use of monitoring tools.<sup>12</sup>



Several new initiatives were implemented during the response to Haiyan. Social media was used by WHO for the first time in the Philippines and was a key part of the risk communication strategy.<sup>13</sup> Another first was the classification and registration form used for foreign medical teams which proved beneficial for coordination.<sup>14</sup> A community-based alcohol intervention programme was piloted in Tacloban City and showed there was a problem with alcohol and introducing a programme to address it possible with minimal resources.<sup>15</sup>

There were three disease surveillance systems used during the response to Haiyan: Philippine Integrated Disease Surveillance and Response (PIDSR), Event-based Surveillance and Response (ESR) and Surveillance in Post Extreme Emergencies and Disasters (SPEED). An assessment of when these systems were operational showed that the two routine systems (PIDSR and ESR) were disrupted only in Leyte province (Region 8), yet almost all areas delayed the activation of SPEED.<sup>16</sup> Another assessment, conducted 16 months after Haiyan in Region 8 only, showed that the reestablishment of PIDSR was slow and not operating at pre-Haiyan levels.<sup>17</sup> A third study analysed the data from SPEED for the three noncommunicable syndromes and found high blood pressure, acute asthma attacks and diabetes were of concern following Haiyan. This study also recommended a more comprehensive surveillance system for NCDs for future disaster response.<sup>18</sup>

Also in this issue, several field investigation reports provide a snapshot of different components of the health response to Haiyan. An assessment of evacuation centres conducted two weeks after Haiyan suggested a variation in the size of the evacuation centres and mixed levels of services.<sup>19</sup> A team from DOH was involved in the management of the dead, which was challenging due to limited access to the affected areas.<sup>20</sup> Water quality testing conducted in the early stages of the response was repeated after local governmental unit teams were trained in water testing, sanitary surveys, water treatment and water safety planning.<sup>21</sup> Efforts for dengue prevention and control were multifaceted, and despite a multitude of potential breeding sites, there were no outbreaks reported.<sup>22</sup> The work of the administrative team from the WHO Representative Office in the Philippines was unprecedented; they processed 22 times the annual budget, more than 100 international consultants were hired and the staff more than doubled.<sup>23</sup>

The response to Haiyan provided other key lessons for future responses. A case control study showed that not evacuating before the storm, despite official recommendations, was the greatest risk factor for dying during Typhoon Haiyan and that the use of the term “storm surge” to warn the public before Typhoon Haiyan was not understood.<sup>24</sup> Medicine management during the response was difficult and was compounded by receiving donation of short-dated, near-expiry and unnecessary items which created additional burden on the health system.<sup>25</sup> A small study of self-reported health costs suggested many people had catastrophic out-of-pocket health expenditures with consultation and transportation costs as the main barriers to health service utilization.<sup>26</sup>

This cross-section of articles provides many observations and lessons learnt from the health response to Typhoon Haiyan in the Philippines. We would like to highlight what we see as the three key lessons from the overall response. First, there were waves of health needs post-Haiyan, with risks for some communicable diseases (e.g. rabies, dengue and measles) extending through the recovery period and demands for NCDs, mental health and maternal health continuing for months after the official response period had ended. The second lesson was that data to support epidemiological and operational research during disaster response, although required, was often limited and improving essential data collection as part of disaster preparedness would help ensure critical operational research during disaster responses can be undertaken. Finally, we learnt national responders have a wealth of knowledge and experience that needs to be published. Support should be provided for capacity building to facilitate research and the publication of findings to help strengthen the collective response to emergencies.

We are grateful that we have had the opportunity to be part of capacity building of many first time authors in this issue of WPSAR. We would like to thank all the authors for their commitment and perseverance in getting their work published. We also encourage other first time authors to submit their experiences in responding to disasters to WPSAR.

## References

1. Guha-Sapir D, Hoyois PH, Below R. *Annual disaster statistical review 2013: the numbers and trends*. Brussels, Centre for Research on the Epidemiology of Disasters (CRED), 2014

- ([http://www.cred.be/sites/default/files/ADSR\\_2013.pdf](http://www.cred.be/sites/default/files/ADSR_2013.pdf), accessed 9 October 2015).
2. *The 2014 World Risk Report*. Bonn, United Nations University-Institute for Environment and Human Security (UNU-EHS), 2014 (<http://i.unu.edu/media/ehs.unu.edu/news/4070/11895.pdf>, accessed 13 October 2015).
  3. *SitRep No. 108 re Effects of Typhoon Yolanda (Haiyan)*. Quezon City, National Disaster Risk Reduction and Management Council, 2014 ([http://www.Effects\\_of\\_Typhoon\\_YOLANDA\\_\(HAIYAN\)\\_SitRep\\_No\\_108\\_03APR2014.pdf](http://www.Effects_of_Typhoon_YOLANDA_(HAIYAN)_SitRep_No_108_03APR2014.pdf), accessed 13 October 2015).
  4. Mori N et al. Local amplification of storm surge by Super Typhoon Haiyan in Leyte Gulf. *Geophysical Research Letters*, 2014, 41:5106–5113. doi:10.1002/2014GL060689 pmid:25821268
  5. Gocotano et al. Is the response over? The transition from response to recovery in the health sector post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):5–9. doi:10.5365/wpsar.2015.6.2.HYN\_007
  6. *Emergency response framework (ERF)*. Geneva, World Health Organization, 2013 ([http://www.who.int/hac/about/erf\\_.pdf](http://www.who.int/hac/about/erf_.pdf), accessed 9 October 2015).
  7. *Typhoon Haiyan (Yolanda) one year on: Factsheet overview*. Manila, World Health Organization in the Philippines, 2014 (<http://www.wpro.who.int/entity/philippines/mediacentre/features/yolandafactsheetoverview.pdf>, accessed 13 October 2015).
  8. Gocotano et al. Can you help me write my story? The institutional affiliation of authors of international journal articles on post-disaster health response. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):10–14. doi:10.5365/wpsar.2015.6.3.HYN\_019
  9. Lew et al. Restarting the tuberculosis programme post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):91–95. doi:10.5365/wpsar.2015.6.2.HYN\_009
  10. Kitong J, Calibo A. Guidelines and training for maternal and newborn care post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):15–17. doi:10.5365/wpsar.2015.6.3.HYN\_025
  11. Benigno MR et al. Responding to the health and rehabilitation needs of people with disabilities post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):53–59. doi:10.5365/wpsar.2015.6.2.HYN\_010
  12. Martinez R et al. Use of the WHO package of essential noncommunicable disease intervention after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):18–20. doi:10.5365/wpsar.2015.6.3.HYN\_024
  13. Cool CT et al. Social media as risk communication tool following Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):86–90. doi:10.5365/wpsar.2015.6.2.HYN\_013
  14. Peiris S et al. Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):29–33. doi:10.5365/wpsar.2015.6.2.HYN\_014
  15. Czaicki AE et al. Is my drinking a problem? A community-based alcohol intervention programme post-Haiyan in Tacloban City. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):96–101. doi:10.5365/wpsar.2015.6.2.HYN\_016
  16. Tante S et al. Which surveillance systems were operational after Typhoon Haiyan? *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):66–70. doi:10.5365/wpsar.2015.6.2.HYN\_015
  17. Gallardo FDL et al. An assessment of the case notification system 16 months after Typhoon Haiyan in Region 8, the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):71–75. doi:10.5365/wpsar.2015.6.2.HYN\_002
  18. Martinez R et al. Surveillance for and issues relating to noncommunicable diseases post-Haiyan in Region 8. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):21–24. doi:10.5365/wpsar.2015.6.3.HYN\_020
  19. Ramos AR et al. Rapid health assessments of evacuation centres in areas affected by Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):39–43. doi:10.5365/wpsar.2015.6.2.HYN\_003
  20. Ballera JE et al. Management of the dead in Tacloban City after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):44–47. doi:10.5365/wpsar.2015.6.2.HYN\_004
  21. Magtibay B et al. An assessment of drinking-water quality post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):48–52. doi:10.5365/wpsar.2015.6.2.HYN\_011
  22. Aumentado C et al. The prevention and control of dengue after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):60–65. doi:10.5365/wpsar.2015.6.3.HYN\_018
  23. Urquico R et al. Managing surge staff and resources at the WHO Representative Office in the Philippines during the Typhoon Haiyan response. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):25–28. doi:10.5365/wpsar.2015.6.3.HYN\_023
  24. Ching PK et al. An assessment of disaster-related mortality post-Haiyan in Tacloban City. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):34–38. doi:10.5365/wpsar.2015.6.2.HYN\_005
  25. Salenga R et al. Medicines management in the Philippine public sector during the response to Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):82–85. doi:10.5365/wpsar.2015.6.2.HYN\_012
  26. Espallardo NL et al. A snapshot of catastrophic post-disaster health expenses after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):76–81. doi:10.5365/wpsar.2015.6.2.HYN\_017

# Is the response over? The transition from response to recovery in the health sector post-Haiyan

Allison Gocotano,<sup>a</sup> Lester Sam Geroy,<sup>a</sup> Ma Rowena Alcido,<sup>ab</sup> Miguel Manuel Dorotan,<sup>ab</sup> Gloria Balboa<sup>b</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Allison Gocotano (emails: [gocotanoa@who.int](mailto:gocotanoa@who.int) or [allisongocotano@gmail.com](mailto:allisongocotano@gmail.com)).

The Philippine National Disaster Risk Reduction and Management Plan divides disaster management into four phases: (1) prevention and mitigation; (2) preparedness; (3) response; and (4) recovery and rehabilitation.<sup>1</sup> The recovery process is defined as “a sequence of interdependent and often concurrent activities that progressively advance a community toward a successful recovery” and extends from ongoing preparedness to long-term recovery with an overlap between the acute response and short-term and intermediate recovery.<sup>2</sup> In this paper, this period of overlap between response and recovery in the Philippines occurred three to seven months post-Typhoon Haiyan – February 2014 to July 2014.

The need to define when recovery began post-Haiyan had programmatic implications which included (1) waiving the normal policy of donated medicines and shouldering the tax duties of donors, (2) waiving the licence to practise medicine for foreign professionals and (3) expedited government and non-government administrative processes during an emergency. Government and humanitarian actors needed a common understanding of the different phases of the emergency to determine programme priorities. For instance, the tuberculosis programme prioritized tracing all patients (and records) and restoring their treatment in the response phase; in the recovery phase, active case finding was resumed.<sup>3</sup> The Philippines’ Surveillance in Post Extreme Emergencies and Disasters (SPEED), the mobile-based early warning system, was implemented during the response phase and should be shifted to the Philippine Integrated Disease Surveillance and Response system in the recovery phase.<sup>4</sup>

During the overlap period between response and recovery activities, the authors were all working in the health sector at the national level supporting coordination and strategic planning with government and partners and at the field level implementing response activities and revisiting the medium- and long-term programming approach to recovery. It is from this perspective, combined with data from existing documents such as plans, reports and policies, that we highlight the need to define a period of transition from response to recovery of the health sector as it may have important implications on the health system functioning as a whole.

## RESPONSE PHASE

The Philippine Government declared a State of National Calamity on 11 November 2013, three days after the typhoon, triggering the involvement of the international community. The Philippine health sector response started before this declaration and was characterized by the deployment of personnel, monetary assistance and the distribution of goods for lifesaving measures in preparation for anticipated health needs. The Emergency Relief Coordinator formally activated an Inter-Agency Standing Committee (IASC) Level 3 emergency response the following day (12 November), noting that the magnitude of this sudden-onset humanitarian crisis justified system-wide resource mobilization.<sup>5</sup> A massive international response was launched, and more than 450 international, surge-capacity staff of various expertise were deployed within three weeks. The United Nations Humanitarian Coordination Team in the Philippines issued a humanitarian action plan on the same day as Level 3 activation.<sup>6</sup>

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Health Emergency Management Bureau, Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 1 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_007

A month later, in December 2013, the Office of the Presidential Assistant for Recovery and Rehabilitation (OPARR) was established. OPARR was an ad hoc government agency mandated to coordinate, facilitate, and integrate the short-, medium- and long-term recovery plans with an overall strategic vision. Prior to Typhoon Haiyan, disaster rehabilitation efforts were overseen by the Philippine National Economic and Development Authority (NEDA) that worked with OPARR to monitor and evaluate the rehabilitation effort.

Plans issued from nongovernment and government sectors detailed damage and needs assessments, and the funding requirements for response. One month after Haiyan, the Strategic Response Plan was released by the United Nations Humanitarian Coordination Team detailing the health sector's priorities to provide life-saving measures, immediate access to water, sanitation, hygiene and to re-establish health services to prevent increased morbidity and mortality.<sup>7</sup> The Government, through NEDA, issued Reconstruction Assistance on Yolanda (RAY), a strategic plan to guide the recovery and reconstruction of areas affected by Typhoon Haiyan (Yolanda) over the short (2013 to 2014) to medium term (2015 and beyond).<sup>8</sup> The health priorities of RAY were repair and reconstruction of public facilities to their pre-disaster state; risk reduction and community resilience, support for health services; mental health and psychosocial support; and governance strengthening.

## TRANSITION PHASE

There were differing views as to when the response phase ended and recovery began. From the international view, IASC confirmed the deactivation of the Level 3 response on 11 February 2014 (three months after it was issued).<sup>5,9</sup> From the national view, it ended when the Philippines officially transitioned from the humanitarian relief phase to the rehabilitation and recovery phase on 4 July 2014 (seven months post-Haiyan).<sup>10</sup> This four-month difference between declarations represented the overlap between the response and recovery phases for Typhoon Haiyan from both perspectives, and in the context of this discussion, is labelled as the 'transition phase'.

When Level 3 was de-activated, SPEED was seeing a decline in consultations to the level similar to normal

conditions.<sup>11</sup> Almost half of the foreign medical teams left after the first month of the response (Figure 1).<sup>12</sup>

The decline of consultations and utilization of medical missions coincided with the work of nongovernmental organizations (NGOs) supplementing the health sector. Most of the NGO medical missions were funded and active between four and six months post-Haiyan. Since consultations had reduced, there was no urgency to continue their services. Around the fourth month, local governments took over the bulk of health service delivery to the people. Many of the international partners handed over patients and donated surplus medical equipment and supplies to local health authorities when they left. Of the health partners who stayed on, a shift from an emergency to a medium- to long-term development agenda was observed.

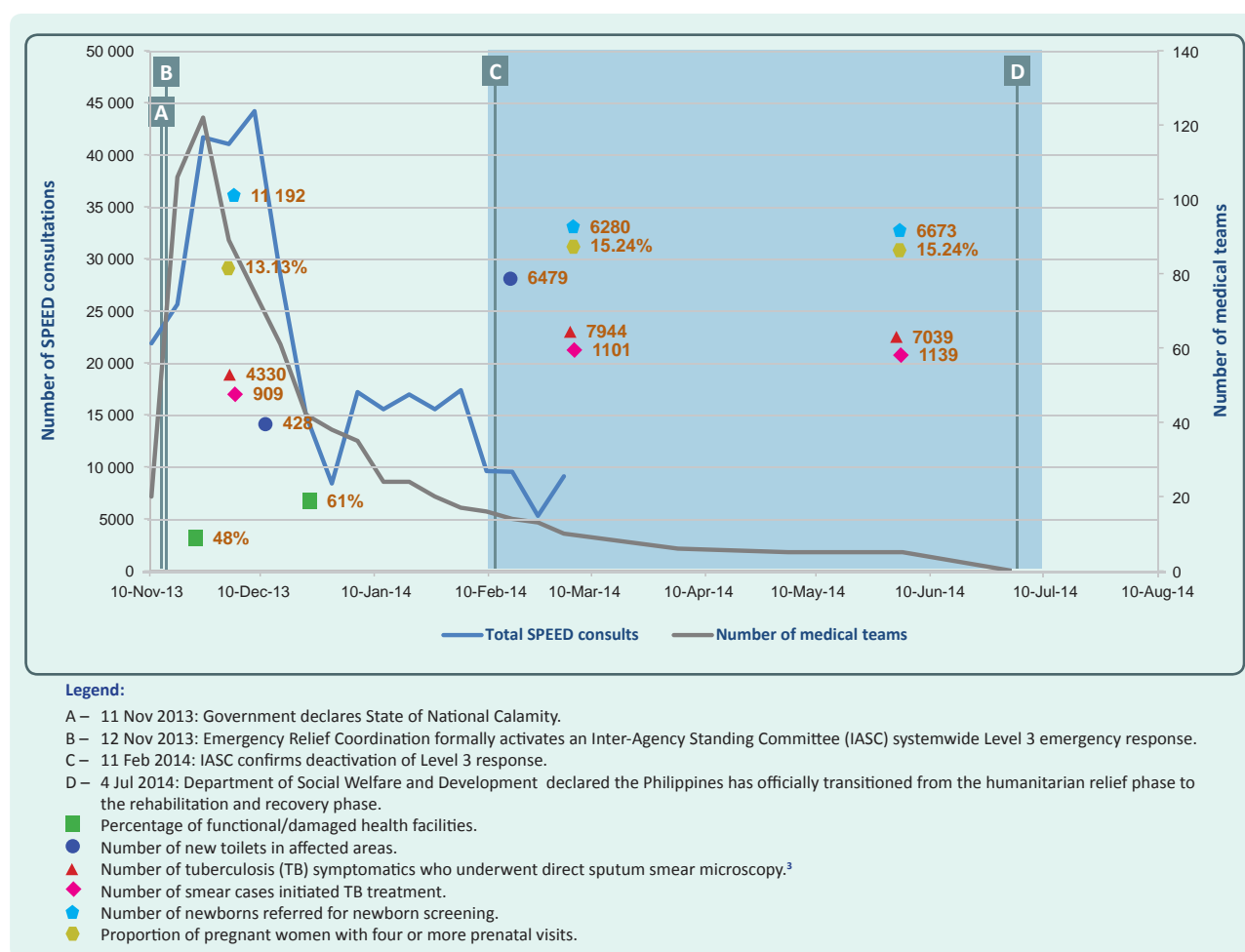
During this period, coordination of remaining health actors also evolved. While a cluster system of coordination was still operational at the national and regional levels, in March 2014, OPARR requested all health actors develop rehabilitation plans. These then formed the master rehabilitation plan, including activities for health facility repairs and construction for social services through support to several public health programmes.<sup>13</sup> The private sector contribution was also documented in the OPARR master plan.

In May 2014, two months later, the transition to recovery was formalized when the national emergency response health cluster structure transitioned into the Health Sector Rehabilitation and Reconstruction Coordination Group.<sup>14</sup> This national-level action was reflected at subnational government levels in three ways: (1) individual cluster meetings (health; water, sanitation and hygiene; nutrition; and mental health and psychosocial support) were integrated; (2) the frequency of meetings decreased from daily to monthly by June 2014; and (3) activities initially supported by the international co-cluster leads were gradually handed over to the government. The previously established five subnational level health coordination hubs (Ormoc, Roxas, Cebu, Tacloban and Eastern Samar) were reduced to four with the remaining hubs coordinating recovery work.<sup>15</sup>

As well as the ongoing disaster-related activities, annual operational plans had to be implemented by



Figure 1. Timeline of the response and recovery phases for Typhoon Haiyan, the Philippines, November 2013 to August 2014



SPEED, Surveillance in Post Extreme Emergencies and Disasters.

the government. In some instances this caused tension between international and government health workers. International health workers felt a strong responsibility to the still affected population and national health workers had a strong desire to rebalance priorities.<sup>6</sup> Given this, minor setbacks in achieving routine outcomes were expected during this period. However, this was not the case post-Haiyan, as setbacks were minimal.

Similar indications of transition were observed in service delivery and health programmes during this four-month period. There was an increase in the percentage of functional health facilities in the affected area from 48% (139/289) in November 2013 to 61% (177/289) in December (Figure 1);<sup>16</sup> functionality was an indication of continuity of basic health-care services. In addition, the increase in the number of toilets installed from 428 in December 2013, to 6479 in February 2014 addressed water and sanitation

concerns.<sup>17</sup> The local health capacity was further improved with several trainings on long-term health programming. The Package of Essential Noncommunicable Disease Interventions for Primary Health Care in Low Resource Settings (PEN) started in June 2014 to address early detection and treatment in the community;<sup>18</sup> the Mental Health Gap Action Programme (mhGAP), with more than 130 health professionals, institutionalized the mental health services at the primary care level.<sup>19</sup> Another sign of a recovering health system was the improvement in selected indicators (Figure 1).<sup>3</sup>

The IASC, in its evaluation, concluded that transition included a change in (1) the nature of affected people's needs (emergency to early recovery); (2) the type of programme approaches to meet changing needs (humanitarian to recovery to development); and (3) structures and systems for coordination of assistance (closure of response clusters).<sup>6</sup> The lack of familiarity with

the capacities of a middle-income country; differences between international and national planning time frames; and different views on the boundaries and linkages between emergency relief, early recovery and recovery all contributed to the complexities of transitioning from relief to recovery programming. Further complications were that sectors and regions recovered at different paces and uncertainty on the government's timetable to begin large-scale recovery programmes.<sup>6</sup>

## CONCLUSION

Labelling a temporal mark between response and recovery may have varying implications. First, the degree of significance of the emergency in terms of local and global attention could be altered with consequences on funding opportunities. Second, the declaration of recovery does not imply a reduced humanitarian need or that ongoing interventions can cease; rather, that there is a change in the type of assistance needed. Third, activities might be the same but are now viewed more from the outlook of proactive governance. This change in outlook from victims to survivors is an important factor in the normalization of day-to-day activities which facilitates recovery.

There is a growing notion that recovery starts immediately after an event, but the Haiyan experience showed the transition period was an overlap of different activities among non-government and government agencies at different levels of the health sector. There may have been variability in the way transition was experienced by key stakeholders, operationally and for reprogramming, and there were some improvements within the health system, such as the decrease of external medical teams, handing over patients to local health authorities, increase in functional health facilities as well as capacity-building activities through trainings like PEN and mhGap. Therefore, we suggest that there is no one-time point in which recovery begins, rather there is a transition period of response to recovery that may be different for each disaster. This transition involves the complex network of stakeholders and actions that define the transition period – a period where remaining gaps in response are addressed and that identifies the direction and speed of improving the state of the public's health to better than what it was before the disaster.

## Conflicts of interest

None declared.

## Funding

None.

## Acknowledgements

The authors would like to thank the Philippines Department of Health, in particular the Health Emergency Management Bureau and Regional Offices 6, 7 and 8. We also extend our gratitude to the staff of WHO Representative Office in the Philippines for sharing their experiences and expertise. Finally, we would like to acknowledge those who worked on the front lines for the Typhoon Haiyan response and recovery.

## References

1. *The National Disaster Risk Reduction and Management Plan 2011–2028: Final version December 2011*. Manila, National Disaster Risk Reduction and Management Council (Philippines), 2012 ([http://www.ndrrmc.gov.ph/attachments/article/41/NDRRM\\_Plan\\_2011-2028.pdf](http://www.ndrrmc.gov.ph/attachments/article/41/NDRRM_Plan_2011-2028.pdf), accessed 10 August 2015).
2. *National Disaster Recovery Framework: strengthening disaster recovery for the nation*. Washington, DC, Federal Emergency Management Agency (US), 2011 (<http://www.fema.gov/pdf/recoveryframework/ndrf.pdf>, accessed 10 August 2015).
3. Lew W et al. Restarting tuberculosis programme post-Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):91–95. doi:10.5365/wpsar.2015.6.2.HYN\_009
4. Tante S et al. Which surveillance systems were operational after Typhoon Haiyan? *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):66–70. doi:10.5365/wpsar.2015.6.2.HYN\_015
5. *Inter-Agency Standing Committee Transformative agenda reference document: 2. Humanitarian system-wide emergency activation – definition and procedures*. Geneva, Inter-Agency Standing Committee, 2012 ([https://interagencystandingcommittee.org/system/files/legacy\\_files/2.%20System-Wide%20%28Level%20%29%20Activation%20%2820Apr12%29.pdf](https://interagencystandingcommittee.org/system/files/legacy_files/2.%20System-Wide%20%28Level%20%29%20Activation%20%2820Apr12%29.pdf), accessed 10 August 2015).
6. Hanley T et al. *IASC Inter-agency humanitarian evaluation of the Typhoon Haiyan response*. New York, United Nations Office for Coordination of Humanitarian Affairs, 2014 (<http://www.alnap.org/resource/19318.aspx>, accessed 10 August 2015).
7. Philippines Humanitarian Country Team. *Philippines: Strategic Response Plan for Typhoon Haiyan (November 2013–November 2014)*. New York, United Nations Office for Coordination of Humanitarian Affairs, 2013 (<http://www.unocha.org/cap/appeals/philippines-strategic-response-plan-typhoon-haiyan-november-2013-november-2014>, accessed 10 August 2015).

8. *Official Gazette: Reconstruction assistance on Yolanda*. Manila, National Economic and Development Authority, 2013 (<http://www.gov.ph/2013/12/18/document-reconstruction-assistance-on-yolanda/>, accessed 10 August 2015).
9. *IASC Principals meeting on 14 February 2014 Philippines and South Sudan – final action points*. Geneva, Inter-Agency Standing Committee, 2014 ([https://interagencystandingcommittee.org/system/files/legacy\\_files/IASC%20Principals%20ad%20hoc%2014%20February%202014\\_%20Final%20Action%20Points.pdf](https://interagencystandingcommittee.org/system/files/legacy_files/IASC%20Principals%20ad%20hoc%2014%20February%202014_%20Final%20Action%20Points.pdf), accessed 10 August 2015).
10. *Typhoon Yolanda: a year later*. Manila, Republic of the Philippines, 2014 (<http://www.gov.ph/crisis-response/updates-typhoon-yolanda/>, accessed 10 August 2015).
11. Department of Health (Philippines) and World Health Organization. *EWARN Weekly Summary Report: Week 18, Final Report (Reporting period 10 November 2013 to 08 March 2014)*. Manila, World Health Organization in the Philippines, 2014 ([http://www.wpro.who.int/philippines/typhoon\\_haiyan/media/EWARN-10Nov2013-8Mar2014.pdf?ua=1](http://www.wpro.who.int/philippines/typhoon_haiyan/media/EWARN-10Nov2013-8Mar2014.pdf?ua=1), accessed 10 August 2015).
12. Brolin M, Hawajri O, von Schreeb J. Foreign Medical Teams in the Philippines after Typhoon Haiyan 2013 – who were they, when did they arrive and what did they do? *PLOS Currents Disasters*, 2015.
13. *Yolanda rehabilitation and recovery efforts: consolidated as of 28 July 2014*. Taguig, Office of the Presidential Assistant for Rehabilitation and Recovery, 2014 (<http://president.gov.ph/wp-content/uploads/2014/08/Revised-DraftYolanda-Rehab-Briefer-as-of-1-Aug-2014-w-status-report.pdf>, accessed 10 August 2015).
14. *Minutes of the meeting/records of discussion: Health Partners Coordination Meeting on Rehabilitation Post-Yolanda, 13 May 2014*. Manila, Department of Health, 2014 [Internal document, unpublished].
15. Department of Health (Philippines) and World Health Organization. *Philippines Health Cluster Bulletin, Issue #5, 3 December 2013*. Manila, World Health Organization in the Philippines, 2013 ([http://www.wpro.who.int/philippines/typhoon\\_haiyan/media/HealthClusterBulletin5.03Dec2013.pdf?ua=1](http://www.wpro.who.int/philippines/typhoon_haiyan/media/HealthClusterBulletin5.03Dec2013.pdf?ua=1), accessed 10 August 2015).
16. *Health emergency alert reporting system plus report, 10 January 2014*. Manila, Health Emergency Management Bureau, Department of Health, 2014. [Internal document, unpublished]
17. *Health emergency alert reporting system plus report, 24 February 2014*. Manila, Health Emergency Management Bureau, Department of Health, 2014 [Internal document, unpublished].
18. Martinez RE et al. Use of WHO Package of Essential Noncommunicable Disease Interventions after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):18–20. doi:10.5365/wpsar.2015.6.3.HYN\_024
19. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026

# Can you help me write my story? The institutional affiliations of authors of international journal articles on post-disaster health response

Allison Gocotano,<sup>a</sup> Megan Counahan,<sup>a</sup> Vicente Belizario,<sup>b</sup> Kenneth Hartigan-Go,<sup>c</sup> Gloria Balboa,<sup>d</sup> Marilyn Go,<sup>d</sup> Manuel Dayrit<sup>e</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Allison Gocotano (email: [gocotanoa@who.int](mailto:gocotanoa@who.int) or [allisongocotano@gmail.com](mailto:allisongocotano@gmail.com)).

Public health policies are, in part, shaped by evidence from peer-reviewed journals. Traditionally these papers have been predominantly written by practitioners with academic affiliations or field-based colleagues wanting to share lessons learnt, including those following disease outbreaks, emergencies or disasters.

Typhoon Haiyan left a corridor of destruction across the Philippines that affected the lives of 16 million people, devastated a health system and challenged every sector of the country.<sup>1</sup> The destruction was unprecedented even for one of the world's most disaster-prone countries. Immediately following Haiyan, the World Health Organization (WHO) Representative Office in the Philippines, together with the Philippine Department of Health (DOH), co-led the health response. DOH and WHO Philippines coordinated more than 150 foreign medical teams<sup>2</sup> and more than 500 tonnes of medical supplies and equipment as part of the response. Many lessons were learnt from this experience.

Eighteen months after Haiyan, WHO Representative Office in the Philippines wanted to document these lessons and initiated a compendium of papers with the DOH and local government health offices. When conducting literature searches for this process we found many papers were being written by academics, practitioners and responders who were external to the affected country and commonly with little or no involvement of academics, practitioners and responders

inside the affected country. A previous study of published articles related to the 15 largest disasters (by number of deaths) over the last decade found that while almost all the disasters occurred in non-Organization for Economic Cooperation and Development (OECD) countries, more than 58% of related publications were led by authors from OECD countries.<sup>3</sup>

The objective of this paper was to investigate who had published papers about emergencies and disasters (events) in the last five years. This was not intended to be a full systematic review, rather an assessment of the location of authors of papers published on these events.

## METHODS

We used the Annual Disaster Statistical Review from the Centre for Research on the Epidemiology of Disasters to determine the top 10 events per year, based on the number of deaths, from 2009 to 2013 (Table 1).<sup>4–8</sup> The countries in which the events took place were classified according to their gross domestic product (GDP) as one of the following: low or low-middle (low) or upper-middle or high (high) income countries.<sup>9</sup>

Between 15 and 18 May 2015, we conducted a PubMed search using standardized search parameters for health-related peer-reviewed papers published about these events. The search strategy was intended to cover the three humanitarian clusters that form the health response to an event: health (including mental health),

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Office for Technical Services, Department of Health, Sta Cruz, Manila, Philippines.

<sup>c</sup> Office for Health Regulation, Department of Health, Sta Cruz, Manila, Philippines.

<sup>d</sup> Health Emergency Management Bureau, Department of Health, Sta Cruz, Manila, Philippines.

<sup>e</sup> Ateneo School of Medicine and Public Health, Pasig City, Philippines.

Submitted: 31 July 2015; Published: 6 November 2015

doi: [10.5365/wpsar.2015.6.3.HYN\\_019](https://doi.org/10.5365/wpsar.2015.6.3.HYN_019)



nutrition and water, and sanitation and hygiene.<sup>10</sup> The search terms were “event type” (e.g. typhoon) AND “country” (e.g. Philippines) AND “year of disaster” (e.g. 2002) AND (medical OR surgical OR disease OR outbreak OR health OR nutrition OR mental OR psychosocial OR sanitation OR hygiene OR drink OR drinking). For weather disturbances such as tropical depressions and cyclones the “event type” was converted into a nested search strategy to include the “international name” (e.g. Haiyan) OR “local name” (e.g. Yolanda) OR “meteorological term” (e.g. tropical cyclone). The search results were refined and only those publications written within three years of the event were included.

Each article was reviewed to ensure it was written post-event. Institutional affiliations for all authors were classified as being internal or external to the affected country based on the location of their affiliation. We separated lead author and coauthors; authors affiliated with institutions and/or organizations with both internal and external locations to the affected country were classified as internal. When we could not determine an author’s affiliation we classified it as unknown. When authorship was collective (e.g. Centers for Disease Control and Prevention) we classified it as external. Affiliation to international organizations including United Nations agencies was also classified as external since we could not determine whether a specific United Nations agency was at the country, regional or global level. It also was not possible to determine if a specific author was a national or an international staff. Assessing the degree of involvement of these institutions in the response was not considered in this classification.

## RESULTS

There were no publications for 17 of the 50 events (Table 1); all but three of these (one each for the Russian Federation, Peru and China) were from low-income countries. There were 834 articles published about the other 33 events across 19 countries by 3991 authors. There were 466 papers from 19 events in high-income and 368 papers from 14 events in low-income countries. Overall, there was an average of 25 papers per event, ranging from one for the 2013 United Kingdom heat wave to 297 for the 2010 Haiti earthquake.

The affiliations of lead and corresponding authors were more often internal when the country affected was

a high-income country, whereas in low-income countries there were more external authors. This remained when we looked separately at lead/corresponding author and when we included coauthors (Table 2).

While more events with high mortality were associated with low-income countries when compared with high-income (87 208 cumulative deaths in high- vs 243 334 in low-income countries) there were fewer publications for the events in low-income countries.

The magnitude of the disaster appeared to influence the number and type of papers published. Those events which had a large humanitarian response resulted in more papers than those managed from the resources within the affected country. The 2010 Haiti earthquake is one such example. There was a considerable international humanitarian presence for the earthquake and 276 publications; the secondary cholera outbreak had 21 publications.

## DISCUSSION

Our study found that most articles on events in low-income countries published in peer-reviewed journals were most commonly written by authors with institutional affiliations external to the country of the event. We also found fewer papers were written about events in low-income countries when compared to high-income countries. This highlights the need for establishing institutional links for capacity and institutional development for scientific writing in low-income countries.

To build capacity in scientific writing to facilitate the publication of the lessons learnt from Haiyan, we partnered with the *Western Pacific Surveillance and Response Journal* (WPSAR) that offers pre-submission support for first-time authors. This included a five-day workshop on scientific writing with follow-up support for each paper individually. WPSAR then published these articles in this issue. This enabled authors within the Philippines to learn how to write scientific papers and to provide a local perspective for their publications.

Lessons from a highly resourced country on how they responded to an event may not be as helpful to a country with fewer resources as those from a low-income country. We assume that having a better understanding of the context, whether you are an internal or external actor, will likely improve outcomes. Post-event researchers,

Table 1. Top 10 emergencies or disasters (events) per year, based on the number of fatalities, 2009 to 2013<sup>3-7</sup>

Year	No.	Event	Month	Country	Fatalities
2013	1	Tropical cyclone 'Haiyan'	November	Philippines	7354
	2	Flood	June	India	6054
	3	Heat wave	July	United Kingdom	760
	4*	Heat wave	April–June	India	557
	5	Earthquake	September	Pakistan	399
	6	Heat wave	May–September	Japan	338
	7*	Flood	August	Pakistan	234
	8	Flood	July	China	233
	9*	Earthquake	October	Philippines	230
	10*	Flood	September–October	Cambodia	200
2012	1*	Tropical cyclone 'Bopha'	December	Philippines	1901
	2	Flood	August–October	Pakistan	480
	3*	Flood	July–October	Nigeria	363
	4	Earthquake	August	Iran (Islamic Republic of)	306
	5*	Cold wave	June	Peru	252
	6*	Cold wave	December	India	249
	7	Flood	July	Russian Federation	172
	8*	Cold wave	December	Russian Federation	170
	9	Flood	July	China	151
	10*	Avalanche	April	Pakistan	135
2011	1	Earthquake/Tsunami	March	Japan	19 847
	2*	Tropical cyclone 'Washi'	December	Philippines	1439
	3	Flood	January	Brazil	900
	4	Flood	August–December	Thailand	813
	5	Earthquake	October	Turkey	604
	6	Flood	August–November	Pakistan	509
	7	Flood	June	China	467
	8	Storm	April	United States of America	354
	9*	Flood	August–November	Cambodia	247
	10	Flood	August–October	India	204
2010	1	Earthquake	January	Haiti	222 570
	2	Heat wave	June–August	Russian Federation	55 736
	3	Earthquake	April	China	2968
	4	Flash flood	July–August	Pakistan	1985
	5*	Mass movement wet	August	China	1765
	6	Flood	May–August	China	1691
	7	Earthquake	February	Chile	562
	8	Tsunami	October	Indonesia	530
	9*	Cold wave	July–December	Peru	409
	10*	Mass movement wet	Feb–March	Uganda	388
2009	1	Earthquake	September	Indonesia	1117
	2	Flood	July–September	India	992
	3*	Tropical storm 'Ondoy'	September–October	Philippines	716
	4	Typhoon 'Morakot'	August	China, Taiwan	664
	5	Typhoon 'Pepeng'	October	Philippines	542
	6	Heat wave	January–February	Australia	347
	7	Flood	September–October	India	300
	8	Cyclone 'Aila'	May	Bangladesh	298
	9	Earthquake	April	Italy	295
	10*	Hurricane 'Ida'	November	El Salvador	281

\* These events had no publications.

Table 2. Author classification and average publication by affected country and per capita GDP, top 10 emergencies or disasters (events) per year, 2009 to 2013

GDP per capita	Affected country	Deaths	Events	Articles	Authors	Lead and corresponding authors			Co-authors			Average publications
						Internal	External	Unknown	Internal	External	Unknown	
High	Australia	347	1	3	10	3	0	0	4	0	3	3
	United States of America	354	1	14	58	13	1	0	40	4	0	14
	United Kingdom	760	1	1	6	1	0	0	4	1	0	1
	Japan	20 185	2	236	1195	162	61	13	752	200	7	N/A*
	Italy	295	1	16	116	13	3	0	81	12	7	16
	China, Taiwan	664	1	4	17	4	0	0	12	1	0	4
	Chile	562	1	18	72	12	5	1	28	15	11	18
	Russian Federation	55 908	2	2	10	1	1	0	1	7	0	1
	<b>Subtotal</b>	<b>79 075</b>	<b>10</b>	<b>294</b>	<b>1484</b>	<b>209</b>	<b>71</b>	<b>14</b>	<b>922</b>	<b>240</b>	<b>28</b>	<b>29</b>
Upper-middle	Brazil	900	1	5	15	5	0	0	10	0	0	5
	Turkey	604	1	13	61	11	2	0	44	4	0	13
	China	5510	5	130	904	105	23	2	540	68	166	26
	Iran (Islamic Republic of)	306	1	15	62	14	0	1	40	2	5	15
	Thailand	813	1	9	42	7	2	0	24	6	3	9
	<b>Subtotal</b>	<b>8133</b>	<b>9</b>	<b>172</b>	<b>1084</b>	<b>142</b>	<b>27</b>	<b>3</b>	<b>658</b>	<b>80</b>	<b>174</b>	<b>19</b>
Lower-middle	Indonesia	1647	2	12	53	4	6	0	13	25	5	6
	Philippines	7896	2	23	66	2	20	1	7	36	0	12
	India	7550	4	17	74	12	5	0	21	24	12	4
	Pakistan	3373	4	17	61	3	9	5	14	15	15	4
	<b>Subtotal</b>	<b>20 466</b>	<b>12</b>	<b>68</b>	<b>254</b>	<b>21</b>	<b>40</b>	<b>6</b>	<b>55</b>	<b>100</b>	<b>32</b>	<b>6</b>
Low	Bangladesh	298	1	3	18	1	2	0	10	5	0	3
	Haiti	222 570	1	297	1151	4	255	37	47	559	249	297
	<b>Subtotal</b>	<b>222 868</b>	<b>2</b>	<b>300</b>	<b>1169</b>	<b>5</b>	<b>257</b>	<b>37</b>	<b>57</b>	<b>564</b>	<b>249</b>	<b>150</b>
<b>Total</b>		<b>330 542</b>	<b>33†</b>	<b>834</b>	<b>3991</b>	<b>377</b>	<b>395</b>	<b>60</b>	<b>1692</b>	<b>984</b>	<b>483</b>	<b>N/A</b>

\* Of the two events in Japan, one generated just one article, while the other had 235 articles.

† 17 events had no publications.

GDP, gross domestic product; and N/A, not applicable.

particularly those reporting from lower-income countries who are external to the affected country, should be strongly encouraged to form proactive collaborations with local researchers.

We acknowledge that there are some limitations in our study. Publications in journals not indexed in PubMed were not included in our study. We also did not search other databases or the wider grey literature. However, as one of the key purposes of publication is for the international community to learn, a non-index journal makes learning from colleagues' experiences more difficult.

We accept that the results of this study could also be due to several influencing factors. High-income countries are better resourced and are likely to have more institutions capable, interested and resourced to respond and then publish their findings than low-income countries with fewer resources. Institutional incentives to publish, availability of research funding, capability and specific topic or policy interests are all contributing factors. However, there is an ethical, developmental and academic argument for external authors to be

more inclusive of internal authors provided that internal institutions are willing to put in the necessary effort required for authorship. It is also likely that events from high-income countries are managed internally hence generating more internal publications. The degree of investment from high-income countries to support response efforts in low-income country events may also influence authorship affiliation.

While GDP will influence available resources, the difference between the number of papers resulting from major events in low- and high-income countries can be possibly explained by other factors. For events in low-income countries – external international support is time-limited and teams leaving the country have to report on their inputs to the government and other donors. This period of reflection and reporting lends itself to publication often done more easily outside the affected country which means those inside the country cannot contribute as easily. Internal players, including those in government, continue responding beyond the initial relief effort through the different phases of the response (recovery, development etc.) and the reflection process may not be prioritized or conducted at all.

Our initial observation tells us that most authors of post-disaster articles were external to the affected country if the disaster was in a low-income country. Increased collaboration between internal and external authors is warranted as are other mechanisms to build capacity in scientific writing, such as collaboration with a peer-reviewed journal. Sharing experiences and lessons learnt are ideally communicated through a collection of views to provide a balanced and more rigorous contribution to the international body of research.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

This paper was reviewed by Dean Jikyeong Kang of the Asian Institute of Management and Dean Romeo Quizon of the University of the Philippines College of Public Health. The authors acknowledged their support to the key message on increased collaboration between internal and externally affiliated health-related researchers, particularly in a low-income country post-disaster setting for international journal publication.

### References

1. McPherson, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. Pieris S, Buenaventura J, Zagaria N. Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):29–33. doi:10.5365/wpsar.2015.6.2.HYN\_014
3. Gaillard JC, Gomez C. Post-disaster research: is there gold worth the rush? *Jàmbá: Journal of Disaster Risk Studies*, 2015, 7:6.
4. Vos F et al. *Annual disaster statistical review 2009: the numbers and trends*. Brussels, Centre for Epidemiology of Disasters, 2010.
5. Guha-Sapir D et al. *Annual disaster statistical review 2010: the numbers and trends*. Brussels, Centre for Epidemiology of Disasters, 2011.
6. Guha-Sapir D et al. *Annual disaster statistical review 2011: the numbers and trends*. Brussels, Centre for Epidemiology of Disasters, 2012.
7. Guha-Sapir D, Hoyois P, Below R. *Annual disaster statistical review 2012: the numbers and trends*. Brussels, Centre for Epidemiology of Disasters, 2013.
8. Guha-Sapir D, Hoyois P, Below R. *Annual disaster statistical review 2013: the numbers and trends*. Brussels, Centre for Epidemiology of Disasters, 2014.
9. *National Accounts Main Aggregates Database: December 2013, (Select all countries, "GDP, Per Capita GDP - US Dollars", and 2013 to generate table)*. New York, United Nations Statistics Division, 2013 (<http://unstats.un.org/unsd/snaama/selcountry.asp>, accessed 27 August 2015).
10. *Humanitarian response*. New York, United Nations Office for the Coordination of Humanitarian Affairs, 2015 (<https://www.humanitarianresponse.info/clusters>, accessed 27 August 2015).



# Guidelines and training for maternal and newborn care post-Haiyan

Jacqueline Kitong<sup>a</sup> and Anthony Calibo<sup>b</sup>

Correspondence to Jacqueline Kitong (email: kitongj@wpro.who.int).

In any disaster-affected population, it is estimated that 3% of the total population will be pregnant, 3.5% will be lactating women and 15% will be adolescents.<sup>1</sup> After Typhoon Haiyan in the Philippines in November 2013 it was estimated that there would be 95 270 pregnant women within the affected areas and 480 000 pregnancies in the year following.<sup>2</sup> The disruption of access to reproductive health care after Haiyan meant that prenatal care, birth attendance, postpartum care and family planning services were urgently required as part of the response.

Despite the influx of international and in-country assistance post-Haiyan,<sup>3</sup> the damage that occurred to health centres made access to services difficult and the wide range of policies and guidelines on maternal, newborn and child health being used by foreign medical teams and international organizations complicated service delivery for maternal and child health. As a result, the *Guidelines for maternal and newborn care during the intrapartum, immediate newborn and postpartum care during emergencies and disaster situation*<sup>4</sup> were developed. This brief report describes the guidelines and the post-Haiyan training programme for the Essential Intrapartum and Newborn Care (EINC) protocol and Kangaroo Mother Care (KMC) components.

## DEVELOPMENT OF MATERNAL AND NEWBORN GUIDELINES

The guidelines for maternal and newborn care following emergencies and disasters in the Philippines,<sup>4</sup> developed by the Philippines Department of Health (DOH), World Health Organization Representative Office in the Philippines and United Nations Children's Fund were ready and distributed from mid-December of 2013, just

six weeks after Haiyan.<sup>5</sup> The guidelines included the following:

- (1) four time-bound interventions for the immediate newborn period;
- (2) essential newborn care including vitamin K, eye prophylaxis, hepatitis B and Bacillus Calmette–Guérin (BCG) vaccination and screening services (metabolic and hearing screening);
- (3) special care for preterm and low birth weight infants such as Kangaroo Mother Care (KMC), cup feeding using expressed breastmilk and lactation support for mothers;
- (4) intrapartum care recommendations and the prevention of intrapartum complications;
- (5) prevention of newborn complications;
- (6) level of care and referral for newborns with and without complications; and
- (7) the components of delivery kits for mothers and newborn kits.

## The EINC protocol

The four time-bound interventions of the EINC protocol (Section 1 of the new guidelines) are evidence-based interventions that emphasize a core sequence of time-bound actions: (1) immediate and thorough drying of the newborn, (2) early skin-to-skin contact between mother and newborn, (3) properly timed cord clamping and cutting, and (4) non-separation of the newborn from the mother for early initiation of breastfeeding.

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Disease Prevention and Control Bureau, Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 5 October 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.3.HYN\_025

Training on the EINC protocol comprised a train-the-trainer approach. Participants of the training workshops, conducted in November and December 2013 in Cebu City and in April 2014 in Tacloban City, included physicians, supervising nurses and senior midwives who were then responsible for conducting training in their area. Trainees were supplied with training equipment such as resuscitation dolls, newborn resuscitation kits with manual suction apparatus, the EINC training kit and delivery simulation kits. The training was aimed at all those involved in the delivery and care of newborns: municipal health officers, maternity ward nurses, resident physicians and rural health midwives who were prioritized. A total of 344 health service providers were trained on the EINC protocol (146 in Region 6, 58 in Region 7 and 140 in Region 8) between January and August 2014.

This new protocol provided simple, cost-effective intrapartum and newborn care interventions for skilled health professionals that improved neonatal and maternal care. This protocol was simple because it required health workers to deliver babies following a logical sequence, and it was cost-effective because no additional materials or equipment were needed to perform the protocol. The usual practices of IV fluid infusion, perineal shaving, and baby oil, powder and soap for the newborn were removed from the protocol.

### Kangaroo mother care (KMC)

KMC, defined as skin-to-skin contact between a mother and her newborn with frequent and exclusive or nearly exclusive breastfeeding, has been shown to be a life-saving intervention for preterm and/or low birth weight (LBW) babies.<sup>6</sup> KMC was included in the guidelines as pregnant women subjected to undue stress and mental or psychological pressure are more likely to have premature and LBW babies.<sup>7,8</sup> It was for this reason that specific training on KMC was conducted at tertiary-level hospitals within the Haiyan-affected areas (Regions 6, 7, 8 and 9). Prior to Haiyan, the Eastern Visayas Regional Medical Center (EVRMC) in Tacloban City in Region 8 was the only accredited KMC Center for Training and Excellence.<sup>9</sup>

The post-Haiyan training in KMC also used a train-the-trainer approach: a five-day training of trainers for 30 participants from tertiary facilities in Regions 6, 7, 8 and 9 using classroom and hands-on workshops in June

and October 2014; each trainer then trained participants from all health services that provided maternal and newborn care. By March 2015, 15 health facilities have had training and implemented KMC.

One of the observed benefits of the KMC programme post-Haiyan was the increased involvement of fathers. Health staff reported that before Typhoon Haiyan, fathers were rarely involved in infant care. After Haiyan, because of KMC training, monitoring, community advocacy, and supportive supervision of health providers, the family and the community, more fathers were observed participating in KMC in EVRMC and Vicente Sotto Memorial Medical Center in Cebu City.

## CONCLUSION

The guidelines for maternal and newborn care following emergencies and disasters in the Philippines were used extensively across the entire health sector and will continue to guide maternal child care in all future emergencies in the Philippines. The four interventions of the EINC protocol were implemented across Regions 6, 7 and 8, and KMC was successfully implemented in 15 health facilities.

This brief report focused on the training programme for the EINC protocol and KMC. A limitation of this report is that formal evaluations of the programmes were not included. However, anecdotal evidence, as well as the high number of health workers trained, suggest the guidelines were useful in this disaster setting. The guidelines could also be adapted for use by other countries, particularly those with low resources and disaster-prone settings. These reasonably straightforward, low cost and low technical interventions allowed for a successful maternal and newborn health response following Haiyan.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

We acknowledge all of our partners in both the guideline development and training teams, which include the

following organisations: Career Movers International, Philippine Nurses Association (Tacloban and Cebu City Chapters), Kangaroo Mother Care Foundation, Kalsusugan ng Mag-ina, Zuellig Family Foundation, International Development Agencies, the Family Health Office of the Department of Health, Philippine Pediatric Society, Integrated Midwives Association of the Philippines, PLAN International, Family Planning Office of the Philippines, Friendly Care, Philippine Obstetrical and Gynecological Society, Ortol Reproductive Health Care Foundation, Save the Children Philippines, World Vision Philippines, the International Medical Corps, United Nations Population Fund, United Nations Children's Fund and United States Agency for International Development. We also thank the staff from the Vicente Sotto Memorial Medical Center and Eastern Visayas Regional Medical Center, especially Ms Dolores Casio and Dr Lilibeth Espinosa.

We also thank Dr Julie Lyn Hall and Dr Benjamin Lane from the WHO Representative Office in the Philippines for their guidance and support.

## References

1. *Minimum initial service package for reproductive health in crisis situations: a distance learning module*. Geneva, United Nations High Commissioner for Refugees, 2011 (<http://www.unhcr.org/4e8d6b3b14.pdf>, accessed 13 October 2015).
2. *Philippines: Typhoon Haiyan – Situation Report No. 4 (as of 10 November 2013)*. Makati City, United Nations Office for the Coordination of Humanitarian Affairs, 2013 (<http://reliefweb.int/sites/reliefweb.int/files/resources/OCHAPhilippinesTyphoonHaiyanSitrepNo.4.10November2013.pdf>, accessed 27 October 2015).
3. Pieris S, Buenaventura J, Zagaria N. Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):29–33. doi:10.5365/wpsar.2015.6.2.HYN\_014
4. Department of Health, World Health Organization and United Nations Children's Fund. *Guidelines for maternal and newborn care during the intrapartum, immediate newborn and postpartum care during emergencies and disaster situation*. Manila, World Health Organization in the Philippines, 2014.
5. *Typhoon Haiyan (Yolanda) one year on: fact sheet on maternal and child health*. Manila, World Health Organization in the Philippines, 2014 (<http://www.wpro.who.int/philippines/media/centre/features/yolandafactsheetmaternalhealth.pdf?ua=1>, accessed 13 October 2015).
6. Dole N et al. Maternal stress and preterm birth. *American Journal of Epidemiology*, 2003, 157:14–24. doi:10.1093/aje/kwf176 pmid:12505886
7. Callaghan WM et al. Health concerns of women and infants in times of natural disasters: lessons learned from Hurricane Katrina. *Maternal and Child Health Journal*, 2007, 11:307–311. doi:10.1007/s10995-007-0177-4 pmid:17253147
8. Conde-Agudelo A, Diaz-Rossello JL, Belizan JM. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *The Cochrane Database of Systematic Reviews*, 2003, (2):CD002771. pmid:12804436
9. *Eastern Visayas Regional Medical Center (EVRMC) accredited as KMC Center for Region VIII*. Tacloban City, Kangaroo Mother Care Foundation, 2012 (<http://www.kangaroocareph.org/history/38-eastern-visayas-regional-medical-center-evrmc-accredited-as-kmc-center-for-region-viii>, accessed 13 October 2015).

# Use of the WHO Package of Essential Noncommunicable Disease Interventions after Typhoon Haiyan

Rammell Eric Martinez,<sup>a</sup> Ronaldo Quintana,<sup>a</sup> John Juliard Go,<sup>a</sup> Ma Sol Villones<sup>b</sup> and Mae Analyne Marquez<sup>b</sup>

Correspondence to Rammell Eric Martinez (email: [martinezra@wpro.who.int](mailto:martinezra@wpro.who.int) or [rammell.martinez@gmail.com](mailto:rammell.martinez@gmail.com)).

**T**yphoon Haiyan hit the Philippines on 8 November 2013 and caused mass destruction;<sup>1</sup> health facilities were destroyed or not functioning and medical supplies were quickly exhausted. Afterwards, people with noncommunicable diseases (NCDs) were more vulnerable due to lack of health care access.<sup>2</sup> This was also reported after the China earthquake where there were high morbidity and deaths from NCDs due to a lack of dialysis, chemotherapy and other medical support for those with an NCD.<sup>3</sup>

The World Health Organization (WHO) Package of Essential Noncommunicable Disease Interventions (PEN) is a “prioritized set of cost-effective interventions that can be delivered to an acceptable quality of care even in resource-poor settings”. These interventions are the minimum standards needed to integrate and advance care of NCDs in primary health care as well as in ensuring equity in providing health care and achieving universal coverage of health reforms.<sup>4</sup>

The PEN approach was adopted by the Philippine Department of Health (DOH) for nationwide implementation;<sup>5</sup> however, implementation was slow due to logistical and manpower issues. After Haiyan, PEN implementation in primary health care facilities became a priority, with Region 8 chosen as a pilot site for using PEN implementation for health system recovery post-disaster. This brief report describes the implementation of two of the four PEN protocols in Region 8 – Protocol 1 on managing and preventing heart attack, stroke and renal disease and Protocol 2 on health education and promotion and smoking cessation.

The key areas for PEN implementation included using the PEN approach to restore service delivery and management in primary health care facilities in Region 8, training health workers on PEN implementation and providing required materials and PEN implementation tools. Monitoring visits that included supportive supervision were also conducted in primary health care facilities in six provinces in Region 8. These assessed the use of the PEN protocols, availability of PEN implementation tools and whether the implementation targets for Region 8 had been met.

## TRAINING AND MATERIALS

From August 2014 to March 2015, 865 health representatives, health managers, service providers and implementers in primary health care facilities, as well as at the regional and provincial health offices, were trained on PEN implementation. Training was conducted for all primary health care facilities in the six provinces of Region 8; this comprised all 143 cities and municipalities (100%).

During the same period, NCD equipment and supplies were provided to all primary health care facilities (100%) in all six provinces and 143 cities/municipalities in Region 8. This included 144 rural health units, 21 district health centres, 28 district hospitals, three diabetic clinics, six provincial health offices, six provincial DOH offices and one NCD unit. Materials included 424 sets of blood pressure measuring devices, 424 units of glucose, cholesterol and uric acid (GCU) meters, 788 packs of lancets, 488 canisters

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Region Office 8, Department of Health, Tacloban City, Leyte, Philippines.

Submitted: 22 September 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.3.HYN\_024



Table 1. Results of the monitoring visits for PEN implementation, Region 8, the Philippines, November 2014–March 2015

Region/ Province	Number of facilities monitored			Number and percentage of facilities implementing PEN						Facilities with essential medicines always available	
	Nov–Dec 2014	Feb–Mar 2015	Total	Nov–Dec 2014		Feb–Mar 2015		Total			
				<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
Biliran	2	4	6	1	50	3	75	4	67	1	17
Southern Leyte	3	4	7	3	100	4	100	7	100	1	14
Leyte	15	6	21	2	13	4	67	6	29	7	33
Northern Samar	-	4	4	-	-	4	100	4	100	0	0
Eastern Samar	5	5	10	-	-	1	20	1	10	1	10
Western Samar	-	4	4	-	-	1	25	1	25	0	0
<b>Total</b>	<b>25</b>	<b>27</b>	<b>52</b>	<b>6</b>	<b>24</b>	<b>17</b>	<b>63</b>	<b>23</b>	<b>44</b>	<b>10</b>	<b>19</b>

PEN, Package of Essential Noncommunicable Disease Interventions.

(12 200 pieces) of blood glucose strips and 480 canisters (4800 pieces) of blood cholesterol strips.

Adequate materials for the implementation of PEN were also distributed, including NCD risk assessment forms, target client assessment logbooks, cardiovascular disease risk registry logbooks, risk prediction charts, copies of the PEN protocol algorithm and PEN pocket booklets.

## MONITORING VISITS

Primary health care facilities were randomly selected from the National Health Facility Registry for monitoring visits and supportive supervision over two time periods – November to December 2014 and February to March 2015. Six of 25 (24%) monitored primary health care facilities had started implementing PEN during the first round, and 17 of 27 (63%) had started implementing PEN during the second round. Overall, 10 of the 52 (19%) primary health care facilities reported they had essential medicines “always available” (Table 1).

## PEN INDICATORS

After six months, two of the four PEN indicators had been met in Region 8: all primary health care facilities had trained health service providers and complete sets of essential equipment (Table 2). The other two indicators had not been met as only 19% of monitored primary health care facilities had complete sets of essential medicines provided by the DOH and only 44% were implementing PEN where the target for each was 80%.

## DISCUSSION

PEN implementation in Region 8 after Haiyan has resulted in trained health service providers; availability of essential equipment, supplies and medicines; functional referral systems; and use of monitoring tools.

The built-in mechanisms of PEN should ensure its sustainability. To further support this, a sustainability plan was developed that included having a NCD Coordinator/PEN Focal Person and Programme Manager at the DOH

Table 2. Results of PEN implementation by indicator, Region 8, the Philippines, August 2014–March 2015

PEN indicator	Results
80% of primary health care facilities with trained health service providers on PEN	100% of primary health care facilities with trained health service provider on PEN
80% of primary health care facilities with essential equipment (BP monitor, stethoscope, tape measure, height board, GCU metres)	100% of primary health care facilities (rural health units, city health offices, district health centres) with complete sets of essential equipment
80% of primary health care facilities implementing PEN	44% of monitored primary health care facilities implementing PEN
80% of primary health care facilities with essential medicines	19% of monitored primary health care facilities with complete sets of essential medicines provided by the DOH

BP, blood pressure; DOH, Department of Health; GCU, glucose cholesterol uric acid; and PEN, Package of Essential Noncommunicable Disease Interventions.

Office in Region 8 who will be responsible for conducting monitoring activities and supportive supervision. The PEN protocols have also been included in the new local government unit score card and in PhilHealth's Tsekap Benefit Package. Including a budget allocation in annual plans and having a manual of operations for PEN will also assist with sustainability.

This pilot project was conducted by government-operated health facilities, i.e. community health stations and rural health units. Therefore, other primary health care facilities such as hospital outpatient clinics and private clinics were not included.

This institutionalization of PEN in Region 8 of the Philippines, which was a priority after Haiyan, shows that the PEN programme is useful for restoring service delivery and management for NDCs in primary health care facilities post-disaster.

### Conflict of Interest

None declared.

### Funding

WHO Representative Office in the Philippines.

### Acknowledgements

We acknowledge our partners from the NCD unit at the Department of Health Regional Office 8 with special mention to Dr Ma Sol Villones and

Ms Mae Analyne Marquez. We also thank those who helped during the trainings: Ms Winnie Grace Dorego, Ms Krystel Charisse Daya, Ms Rani Socorro Pastor, Dr Theresa Caidic, Dr Antonio Ida, Dr Laarni Dacuno and Ms Josephine de la Fuentes. Thanks also to the local government unit partners: Ms Purificacion Nuevo and Mr Cristobal Dexter Mendiola III.

We also thank the two WHO consultants who provide technical input in PEN implementation in Region 8: Dr Francisca Cuevas and Dr Ronald Flores. Special thanks also to the WHO Representative Office in the Philippines.

### References

1. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6 (Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. Martinez RE et al. Surveillance for and issues relating to noncommunicable diseases post-Haiyan in Region 8. *Western Pacific Surveillance and Response Journal*, 2015, 6 (Suppl 1):21–24. doi:10.5365/wpsar.2015.6.3.HYN\_020
3. Chan EY, Kim J. Chronic health needs immediately after natural disasters in middle-income countries: the case of the 2008 Sichuan, China earthquake. *European Journal of Emergency Medicine*, 2011, 18:111–114. doi:10.1097/MEJ.0b013e32833dba19 pmid:20679898
4. *Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resourced settings*. Geneva, World Health Organization, 2010 ([http://www.who.int/nmh/publications/essential\\_ncd\\_interventions\\_lr\\_settings.pdf](http://www.who.int/nmh/publications/essential_ncd_interventions_lr_settings.pdf), accessed 9 October 2015).
5. *Administrative Order No. 2012–0029: Guidelines in the institutionalization of the Philippine package of NCD (PhilPEN) interventions in the management of hypertension and diabetes in the primary health care*. Manila, Department of Health, 2015.

# Surveillance for and issues relating to noncommunicable diseases post-Haiyan in Region 8

Rammell Eric Martinez,<sup>a</sup> Ronaldo Quintana,<sup>a</sup> John Juliard Go,<sup>a</sup> Mae Analyne Marquez,<sup>b</sup> Jae Kyoung Kim,<sup>a</sup> Ma Sol Villones,<sup>b</sup> and Miguel Antonio Salazar<sup>a</sup>

Correspondence to Rammell Eric Martinez (email: martinezra@wpro.who.int or rammell.martinez@gmail.com).

**D**isasters complicate the management of noncommunicable diseases (NCDs) by disrupting access to and delivery of health care, including medicines. Following Typhoon Haiyan in the Philippines in November 2013, much of the health infrastructure was destroyed and health service delivery was severely affected in Region 8. This left many people with NCDs vulnerable as medicines were destroyed or washed away, food was scarce, and access to medicines and drugs and quality health care was difficult.

There is limited information about managing NCDs after disasters. Rapid health assessment tools do not tend to include questions about NCDs or the factors needed to respond to them post-disaster.<sup>1</sup> Most available guidelines for the health sector response post-disaster focus primarily on safe drinking-water, food, sanitation and hygiene, acute medical conditions, acute malnutrition, communicable diseases and injury; guidelines on chronic conditions are limited.<sup>1-3</sup>

After Haiyan, NCD surveillance data were also limited. The Philippine Department of Health (DOH) has several health information systems and registries. The Field Health Services Information System collects information on different public health programmes and provides national health statistics.<sup>4</sup> The Integrated Chronic Noncommunicable Disease Registry System is a web-based system that captures data from hospitals on NCDs such as cancer, diabetes, chronic obstructive pulmonary disease, stroke and renal disease.<sup>5</sup> Primary health care (PHC) facilities, such as village health centres, have no access to this system. The Philippine Disease Surveillance and Response System is the routine disease surveillance system of

DOH, established in compliance with International Health Regulations (2005). It captures data on 23 notifiable diseases and syndromes.<sup>6</sup> The Surveillance in Post Extreme Emergencies and Disasters (SPEED) system provides real-time health information (both cases and deaths) on 21 syndromes, three of which are noncommunicable: high blood pressure, diabetes and acute asthma. SPEED is activated post-disaster and collects health information on a daily basis from facilities in disaster-affected areas.<sup>7</sup> After Haiyan, SPEED was the only surveillance system that provided data on NCD surveillance.

As there were also no specific guidelines or protocols for NCDs post-disaster, the World Health Organization (WHO) Representative office in the Philippines supported the implementation of the WHO Package of Essential Noncommunicable Disease Interventions at the Primary Health Care (PEN) in Haiyan-affected areas. This support included training health providers and providing essential technologies (e.g. blood pressure measuring devices, stethoscopes and devices to determine blood glucose and cholesterol levels) to sustain NCD service delivery after Haiyan.<sup>8</sup>

In this brief report we provide the number of consultations and deaths from NCDs as reported from SPEED post-Haiyan and describe the effects that Haiyan had on people with NCDs as reported by front-line responders.

## METHODS

We obtained the SPEED data set to identify the number of consultations and deaths for the noncommunicable

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Regional Office 8, Department of Health, Tacloban City, Philippines.

Submitted: 6 August 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.3.HYN\_020

Table 1. Outcomes of focus group discussions on NCDs by issue, Region 8, the Philippines, 2014

What were the specific NCD issues encountered?	What are some of the things being done to impact NCDs?	What are your recommendations for future disasters?
<b>Providers</b>		
Totally or partially damaged facilities leading to interruption of health services	Building of temporary health facilities, some health facilities operate from tents and make-shift facilities	Respondent: "Emergency transport and communication facility should always be available in the province/region/nation." Another participant said that this should be integrated in the Health Emergency Preparedness, Response and Recovery Plans.  Respondent: "LGUs need to build a typhoon-resilient facility in case this will happen again in the future."
Lack of human resources in most-affected areas mostly in Eastern Samar, some parts of Western Samar and Leyte	DOH, PHO and others deployed medical teams  Some nearby LGUs responded a day after the typhoon.	Respondent: "There is a need to create stand-by response teams, not only a response team, but one on basic life support and that has reliable equipment."
<b>Patients/consumers</b>		
Stress (no medicines and drugs for NCDs, lack of food and clothing)	Provision of needs depending on the available resources	Respondent: "We need to stockpile ready-to-eat food packs for NCD patients." Another participants said we can use colour-coded food packs according to clients' conditions.
Life-saving medical services not available	Respondent: "We're from the island, we transported patients to the mainland, we asked the Philippines Air Force to airlift the patients."	Respondent: "Establish helplines for air transport."
<b>Logistics (supplies and equipment)</b>		
Medical supplies at primary health care facilities and commercial pharmacies	Medicines and medical supplies are solicited from other health facilities from other municipalities or provinces.	Respondent: "There is a need to develop emergency kits with laminated algorithm."  Respondent: There is a need for stockpiling of stocks, e.g. pre-pack one-month supply of medicines prior to the event (basic/first kit/emergency NCD kit)."  Respondent: "There is a need for a MOA with local/ neighbouring pharmacy to make their medicines available to the LGU in case of emergency."
<b>Policy</b>		
No specific guidelines on NCD management during disaster		Respondent: "There is a need to develop field manuals that include NCDs so that when disaster comes we have guidelines."
<b>Surveillance system</b>		
Limited information on NCD after a health emergency	Establishing operation centre and adopting Health Emergency Management System	Respondent: "SPEED is useful but HEMS add other NCDs on SPEED."
Undocumented cases of NCD morbidity and occurrences, e.g. Basey MHO said three died due to NCD, but the death was not documented		Respondent: "I wish there was a registry so that when a disaster comes we already know whom to help."

DOH, Department of Health; HEMS, health emergency management staff; LGU, local government unit; MHO, municipal health office; MOA, memorandum of agreement; NCD, noncommunicable disease; PHO, provincial health office; and SPEED, surveillance on post extreme emergencies and disasters.

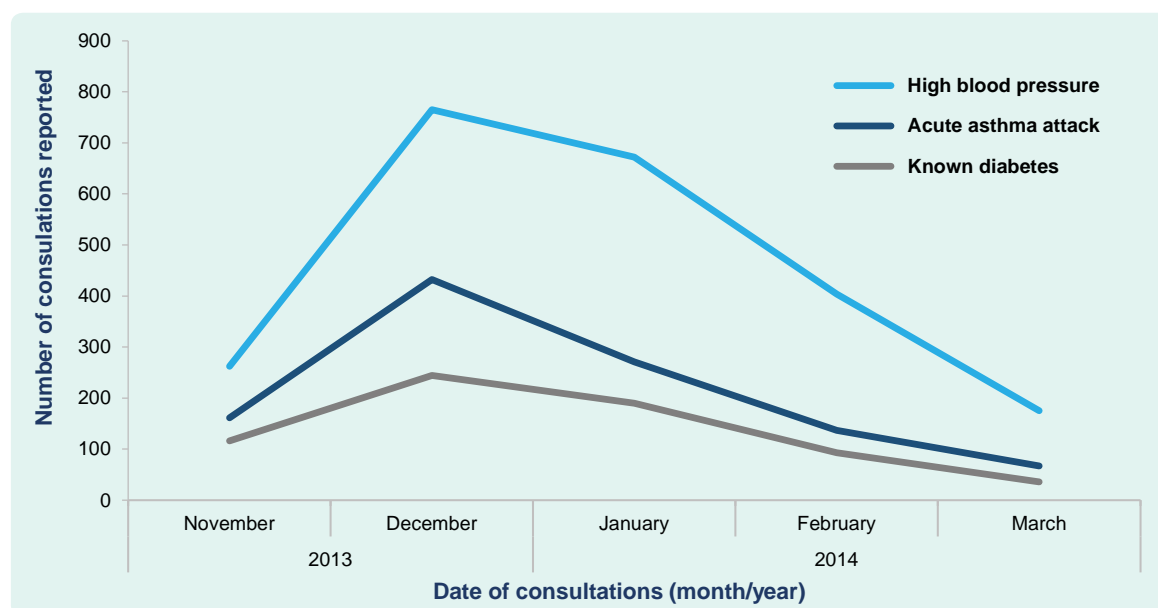
syndromes in Region 8 – high blood pressure, acute asthma attack and diabetes.

PEN implementation included training to determine the effects of Haiyan on people with NCDs.<sup>8</sup> A focus group discussion was conducted with participants from Region 8, the most-affected region. These participants, mostly front-line responders such as medical doctors, nurses, midwives and community health volunteers were

grouped according to provinces; they were asked to discuss the effect Haiyan had on people with NCDs, what was being done and their recommendations for future disaster responses (Table 1). Thirty minutes were allocated with a facilitator moderating the session and group leaders assisting with each province group. Each group was asked to present their findings; content analysis was conducted to summarize participants' responses.



Figure 1. Number of consultations reported on SPEED for noncommunicable syndromes by month, Region 8, the Philippines, 8 November 2013 to 28 March 2014



Source: Health Emergenc Management Staff (2014).

SPEED, Surveillance in Post Extreme Emergencies and Disasters.

## RESULTS

SPEED reporting was conducted in 254 health facilities in four provinces of Region 8 (Leyte, West Samar, East Samar and Biliran) between 8 November 2013 and 28 March 2014. Most reports were from non-hospital facilities compared with hospitals (205/254, 80.7% vs 49/254, 19.3%, respectively). High blood pressure (2278 cases), acute asthma attack (1068 cases) and diabetes (679 cases) were in the top 10 leading causes of SPEED consultations. This compared with 3194 consultations for acute respiratory infection, the most common reason for a consultation. No deaths from the three noncommunicable syndromes were reported in the system. The highest number of consultations for the three conditions were reported in December 2013 with decreasing numbers until March 2014 (Figure 1).

All provinces, cities and municipalities in Region 8 were represented in the focus group discussions. Of the nine conducted, there were three in Biliran Province; three in Leyte Island (in Leyte and South Leyte provinces); and three in Samar Island (one each in Samar, East Samar and North Samar provinces) with 10–15 participants per group. There were eight specific NCD issues including: damage to health facilities that

interrupted usual services and lack of human resources; patient issues: stress with regards to inadequate medicines and other essentials and unavailability of life-saving services; logistics issues: no stock of medicines and medical supplies; policy issues: lack of guidelines for NCDs; and surveillance issues: limited information and undocumented cases and deaths (Table 1).

Some responses to these issues included building temporary clinics, deploying health personnel and soliciting drugs and supplies from nearby provinces and municipalities. Recommendations for future responses included stockpiling food, drugs and medical supplies, developing a field handbook, and reviewing and revising of the Health Emergency Management Bureau surveillance package.

## DISCUSSION

Our study suggested that high blood pressure, acute asthma attacks and diabetes were priority public health concerns following Haiyan. The number of consultations from SPEED for hypertension, asthma and diabetes were highest in December 2013, one month post-Haiyan, which could be due to the disrupted health-care system. The decrease in consultations after December 2013

could be linked to the influx of foreign medical teams and local support in Region 8.

Although there were no deaths from the syndromes captured in SPEED, there were unofficial deaths from NCDs reported by focus group respondents. This could be because the deaths were not caused by the three syndromes included in SPEED or that NCD surveillance was not a primary concern during that time.

Our report has some limitations. As SPEED was the only surveillance system available post-Haiyan for NCDs, our analysis was limited to the three syndromes it includes. Also, the report focused only on Region 8, which was the most-affected region. Therefore the data may not be representative of those in other regions.

In the Philippines, estimating the number of people with NCDs is challenging, especially post-disaster. Although SPEED provided some indication of the NCD burden post-Haiyan, we recommend also using an alternate surveillance system for collecting data on people with NCDs such as enhancing the Integrated Chronic Noncommunicable Disease Registry System.<sup>5</sup> Since primary health care facilities had the most interaction with clients after Haiyan, they should be included in the system. Maintaining a NCD registry at the primary health care level is ideal and vital especially when related to the actual burden of disease and programme management.

Recommended strategies to improve NCD response in future disasters included strengthening primary health care and NCD management, including the development of guidelines and field manuals for health providers managing chronic diseases post-emergency. This included increasing research on NCDs morbidity and mortality patterns during and following emergencies and incorporating NCD-related protocols into existing emergency-related policies. Additional recommendations were to develop technical guidelines on the clinical management of NCDs in emergencies and integrating NCD-specific information into training for emergency workers and emergency-response coordinators.<sup>9</sup>

### Conflicts of interest

None declared.

### Funding

WHO Office in the Philippines.

### Acknowledgements

This paper is dedicated to people in the Haiyan-affected areas, especially Eastern Visayas (Region 8) and international and local organizations that extended their help to Haiyan-affected areas. We thank our partners at the Department of Health Regional Office 8–NCD unit with special mention to Dr Ma Sol Villones and Ms Mae Analyne Marquez. Special thanks to the WHO Representative office in the Philippines Team with special mention to Dr Julie Lyn Hall and to the WHO editing committee: Dr Allison Gocotano and Dr Megan Counahan.

### References

1. *Multi-cluster/sectoral initial rapid assessment (MIRA): Provisional version March 2012*. Geneva, Inter-Agency Standing Committee., 2012 ([http://interagencystandingcommittee.org/system/files/legacy\\_files/2012\\_04\\_mira\\_manual.pdf](http://interagencystandingcommittee.org/system/files/legacy_files/2012_04_mira_manual.pdf), accessed 7 September 2015).
2. *Multi-cluster initial rapid assessment (MIRA) – Nepal for multi-hazard scenarios as of July 2012*. Katmandu, United Nations-Nepal, 2012 ([http://un.org.np/sites/default/files/2012-07-13-questionnaires-july-2012\\_0.pdf](http://un.org.np/sites/default/files/2012-07-13-questionnaires-july-2012_0.pdf), accessed 7 September 2015).
3. *Impact of natural disasters on the health system in Africa*. Geneva, World Health Organization, 2009 ([http://www.preventionweb.net/files/11214\\_WHOpresentationontheimpactofnatural.pdf](http://www.preventionweb.net/files/11214_WHOpresentationontheimpactofnatural.pdf), accessed 7 September 2015).
4. *Field Health Services Information System: web update*. Manila, Epidemiology Bureau, Department of Health, November 2014 ([http://nec.doh.gov.ph/index.php?option=com\\_content&view=article&id=59&Itemid=78](http://nec.doh.gov.ph/index.php?option=com_content&view=article&id=59&Itemid=78), accessed 7 September 2015).
5. *Integrated chronic noncommunicable disease registry system (ICNCDRS) – manual of operations*. Manila, Department of Health, 2012 (<http://chronic.doh.gov.ph/forms/ICNCDRS%20Manual%20of%20Operations.pdf>, accessed 7 September 2015).
6. Gallardo FDL et al. An assessment of the case notification system 16 months after Typhoon Haiyan, Region 8, the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):71–75. doi:10.5365/wpsar.2015.6.2.HYN\_002
7. *Surveillance in Post Extreme Emergencies and Disasters: operations manual for managers*. Manila, Department of Health, 2011 ([http://www.wpro.who.int/philippines/publications/speed\\_operations\\_manual.pdf](http://www.wpro.who.int/philippines/publications/speed_operations_manual.pdf), accessed 7 September 2015).
8. Martinez RE et al. Use of WHO Package of Essential Noncommunicable Disease Interventions after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6 (Suppl 1):18–20. doi:10.5365/wpsar.2015.6.3.HYN\_024
9. Demaio A et al. Noncommunicable Diseases in Emergencies: Call to Action. *PLOS: Currents Disasters*, 2013, Edition 1. doi:10.1371/currents.dis.53e08b951d59ff913ab8b9bb51c4d0de

# Managing surge staff and resources at the WHO Representative Office in the Philippines after Typhoon Haiyan

Rosemarie Urquico,<sup>a</sup> Heleisha Racel Laviña,<sup>a</sup> Megan Counahan<sup>a</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Rosemarie Urquico (email: [urquico@wpro.who.int](mailto:urquico@wpro.who.int)).

The World Health Organization (WHO) Representative Office in the Philippines is accustomed to responding to disasters as the country is frequently hit by typhoons and earthquakes.<sup>1</sup> Between 2009 and 2014 the Philippines was hit by 14 typhoons or tropical storms annually.<sup>2</sup> WHO Representative Office in the Philippines works closely with and is located alongside the Department of Health (DOH) in Metropolitan Manila. Together, they co-lead the humanitarian Health Cluster that provides immediate response and recovery support, technical expertise and capacity enhancement to manage all types of crises. WHO is guided by the Emergency Response Framework (ERF) with the ERF grading system guiding the extent, complexity and duration of WHO support and the required emergency standard operating procedures during responses, ranging from “ungraded” to “Level 3,” the maximum level of response.<sup>3</sup>

Using the ERF system, Typhoon Haiyan was graded as a Level 3 emergency.<sup>4</sup> Haiyan occurred one month after an ERF Grade 2 earthquake in Bohol where over 1.2 million people were affected and an estimated 79 000 structures damaged, some irrevocably.<sup>5</sup> An ERF Level 1 event was also ongoing as a result of a clash between the Moro National Liberation Front and the Armed Forces of the Philippines in September 2013 in what came to be known as the Zamboanga City crisis.<sup>6</sup> In December 2012, the ERF Level 1<sup>7</sup> Typhoon Bopha made landfall three times in Northern Mindanao, Central Visayas and Palawan.<sup>8</sup>

The objective of this paper is to compare the role of the administrative team from the WHO Representative Office in the Philippines in the response following

Typhoon Haiyan to the response with the three previous large-scale events, assess the lessons learnt and provide recommendations for managing future responses.

## METHODS

The Global Management System (GSM) is an Oracle-based, enterprise-resource planning system that records business processes among all levels of WHO<sup>9</sup> in areas of human resources, payroll, budget and finance, procurement, travel and programme management. Each GSM transaction requires a different level of approval from WHO staff. All transactions are processed by the Global Service Centre (GSC) located in Kuala Lumpur, Malaysia.

We assessed records from GSM on two core functions that have a direct effect on disaster responses – staff and consultant contracts and goods procurements. There are several administrative steps involved in contracting staff and consultants, which can vary depending on the type of contract, but at a minimum it involves developing the Terms of Reference and selecting the right candidate, then obtaining the necessary approvals and raising travel requests within GSM for deployment. At each step there are a series of approvals required at the WHO Office in the Philippines, the WHO Regional Office for the Western Pacific and sometimes at WHO headquarters. All goods and service requisitions, once approved by GSM, are processed by GSC.

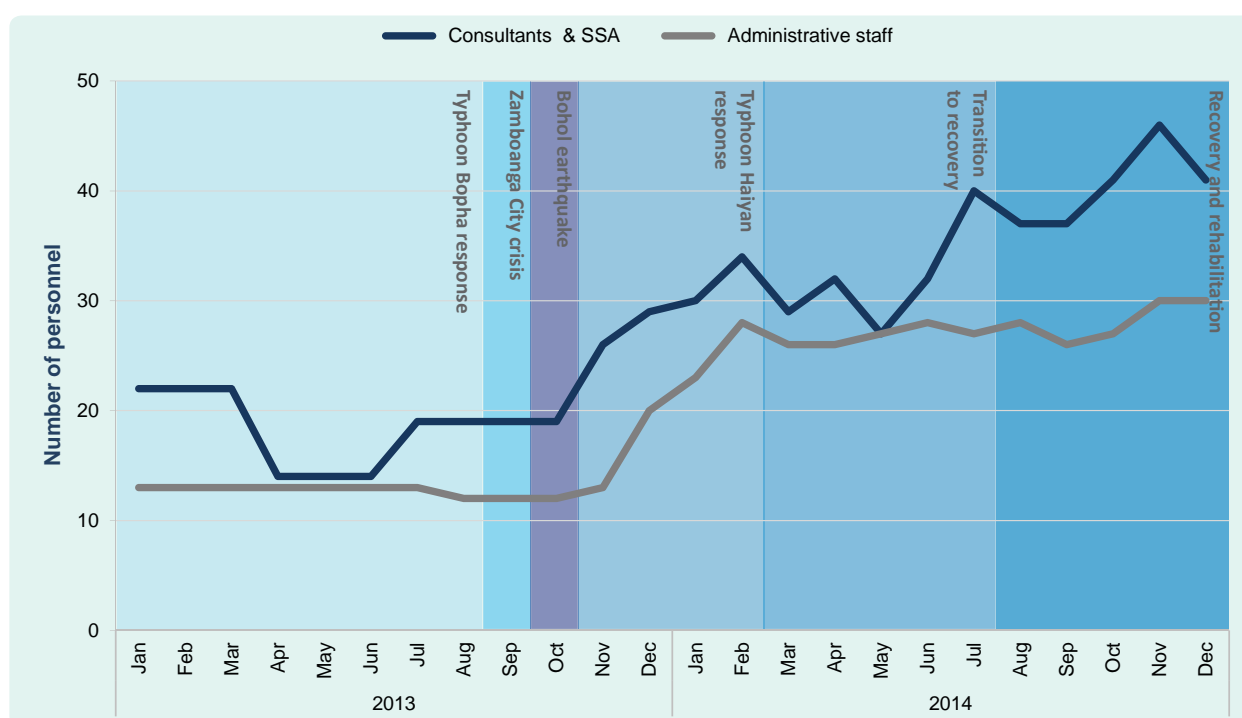
We conducted a retrospective review of the GSM records for procurement, staff and consultants hired from January 2013 to December 2014 as well as assessing the lessons learnt based on our shared experiences.

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

Submitted: 17 September 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.3.HYN\_023

Figure 1. Staff and consultants employed by the WHO Representative Office in the Philippines, 2013 to 2014



SSA, special services agreement.

Our review was for the period that corresponded to Typhoon Bopha, the Zamboanga City crisis, the Bohol earthquake and Typhoon Haiyan. Staff was defined as a short- or long-term staff member of WHO, while consultants were defined as outsiders working for WHO in a consultative capacity.

## RESULTS

There were no additional staff or consultants hired during the Bopha and Bohol responses. The increased workload was handled by existing staff in the WHO Representative Office in the Philippines, usually by working longer hours. All other core technical programmes e.g. immunization and malaria, continued as usual. One staff member was deployed to Bohol to support consultants and staff already on the ground. During the Zamboanga response a local suboffice was setup and managed by two newly recruited staff, an existing staff member and a driver.

By contrast, within days of Haiyan's landfall in November 2013, additional staff from across all levels of WHO assisted the WHO Representative Office in the Philippines, including administrative staff from various technical divisions of the Western Pacific Regional Office. From November 2013 to January 2015, the number of administrative and support staff at the WHO

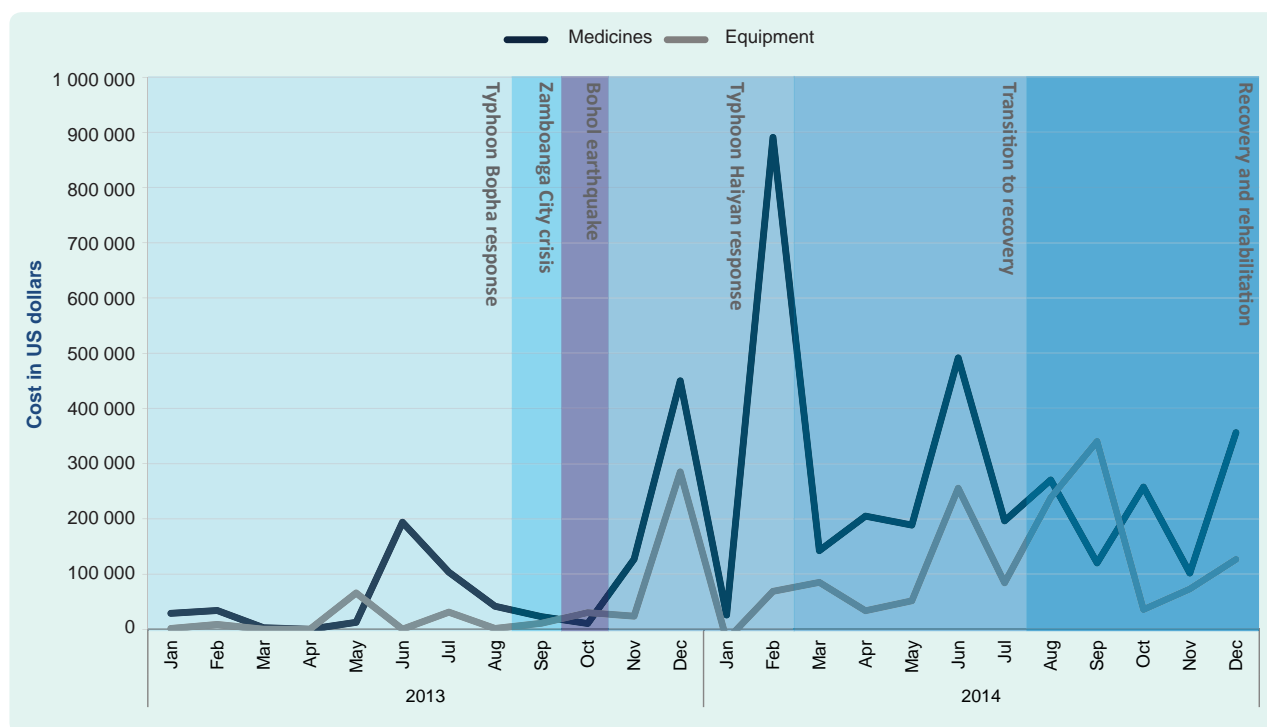
Representative Office in the Philippines increased from 13 to 30, and 106 international consultants were contracted. These consultants included logisticians, experts in relief operations, supply chain specialists, epidemiologists, trauma care experts and more. National consultants were also recruited. Furthermore, seven suboffices were established throughout the affected areas.

The number of international and national consultants decreased into 2014. However, the number of national consultants increased to continue recovery operations with a focus on capacity-building and sustainability (Figure 1).

The work required to recruit and deploy both international and national consultants was enormous. To enhance administrative capacity, the WHO Representative Office in the Philippines increased the number of staff (Figure 1). Requests submitted through GSM for the response to Haiyan were estimated to be in the tens of thousands.

The WHO Representative Office in the Philippines spent approximately 22 times its annual budget during the Typhoon Haiyan response. Almost US\$ 23 million worth of goods and services were procured over

Figure 2. Medicine and equipment spending by the WHO Representative Office in the Philippines, 2013 to 2014



12 months. Medicine and equipment procurement peaked in February 2014 when approximately US\$ 900 000 was spent. (Figure 2).

The large number of requests processed through GSM during the response highlighted that the normative system was not flexible enough to cope with the increased demand of a large-scale disaster response. The process of approvals could not be changed in the system and required several levels of approval from staff who were mostly deployed in the field (with limited internet access) and involved in various aspects of the response. Also, regardless of the type of request, the system required approval by the WHO Representative of the Philippines.

## DISCUSSION

Compared with the business-as-usual response to the three preceding disasters in 2013, the work of the administrative team for the response to Typhoon Haiyan was unprecedented. Disasters will continue to occur in the Philippines, and the WHO Office in the Philippines will continue to support the DOH. This paper has shown the magnitude of the response for logistics

procurement and personnel recruitment. The experience has also shown that the administration team can react and adapt during a large-scale response although there are multiple aspects that can be addressed to improve responsiveness.

We recommend creating an administrative organogram and toolkit with an organizational shift that activates during emergency situations to address these issues. Furthermore, the flexibility of system approvals must be reviewed and improved to facilitate the response to a disaster of such magnitude. As a result of lessons learnt during Haiyan, the WHO Representative Office of the Philippines has created an ERF toolkit with administrative templates and procedures under core services that were implemented during the period to help facilitate future emergency responses.

### Conflicts of interest

None declared.

### Funding

None.



## Acknowledgements

We thank all staff from the WHO Representative Office in the Philippines who put in so much work and heart during the response and recovery for Typhoon Haiyan. We would also like to thank Dr Allison Gocotano, Mr Rommel Millora, Ms Laarni Garcia, Ms Diana Go-Ordinario and Mr Sherif Younan for the guidance and providing data for this report.

## References

1. Gocotano A et al. Can you help me write my story? The institutional affiliations of authors of international journal articles on post-disaster health response. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):10–14. doi:10.5365/wpsar.2015.6.3.HYN\_019
2. *Annual tropical cyclone tracks*. Quezon City, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), 2015 (<http://www.pagasa.dost.gov.ph/index.php/25-tropical-cyclones/33-annual-tropical-cyclone-tracks>, accessed 9 October 2015).
3. *Emergency response framework (ERF)*. Geneva, World Health Organization, 2013 ([http://www.who.int/hac/about/erf\\_.pdf](http://www.who.int/hac/about/erf_.pdf), accessed 9 October 2015).
4. *Typhoon Yolanda (Haiyan) Philippines, Situation Report No. 2 (17 November 2013)*. Manila, World Health Organization Emergency Support Team, 2013 ([http://www.wpro.who.int/philippines/typhoon\\_haiyan/media/Sitrep\\_17Nov2013.pdf?ua=1](http://www.wpro.who.int/philippines/typhoon_haiyan/media/Sitrep_17Nov2013.pdf?ua=1), accessed 9 October 2015).
5. The Government of the Philippines. *NDRRMC Update SitRep No. 35 re effects of magnitude 7.2 Sagbayan, Bohol Earthquake*. New York, ReliefWeb, 2013 (<http://reliefweb.int/report/philippines/ndrrmc-update-sitrep-no-35-re-effects-magnitude-72-sagbayan-bohol-earthquake>, accessed 9 October 2015).
6. International Organization for Migration. *Zamboanga Crisis: Situation Report No. 114, 14 October 2013*. New York, ReliefWeb, 2013 (<http://reliefweb.int/sites/reliefweb.int/files/resources/IOM-Philippines-in-Zamboanga-Crisis-Response-Update-20131014.pdf>, accessed 9 October 2015).
7. Lew W, Zagaria N, Diaz-Herrera C. *Response to the crisis caused by Typhoon Bopha in the Philippines–14 December 2012*. Manila, WHO in the Philippines, 2012 ([http://www.who.int/hac/donorinfo/WHOdonor\\_alert\\_philippines\\_14dec2012.pdf](http://www.who.int/hac/donorinfo/WHOdonor_alert_philippines_14dec2012.pdf), accessed 9 October 2015).
8. *Typhoon Bopha – Dec 2012*. New York, ReliefWeb, 2012 (<http://reliefweb.int/disaster/tc-2012-000197-phl>, accessed 9 October 2015).
9. Posta I, Zahran M. *Review of management, administration and decentralization in the World Health Organization*. Geneva, World Health Organization, 2012 ([https://www.unjui.org/en/reports-notes/JIU%20Products/JIU\\_REP\\_2012\\_6\\_English.pdf](https://www.unjui.org/en/reports-notes/JIU%20Products/JIU_REP_2012_6_English.pdf), accessed 9 October 2015).

# Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan

Sasha Peiris,<sup>a</sup> Joel Buenaventura<sup>b</sup> and Nevio Zagaria<sup>c</sup>

Correspondence to Nevio Zagaria (email: zagarian@wpro.who.int).

In the last three decades there has been an increase in the number of sudden onset disasters causing more than 800 000 deaths and affecting approximately 1 billion people.<sup>1,2</sup> The Islamic Republic of Iran earthquake in 2003, South-East Asia tsunami in 2004, Pakistan earthquake in 2005, Pakistan floods and Haiti earthquake in 2010 all required an immediate health response, surpassing national capacities. A large number of foreign medical teams (FMTs) were deployed in these responses, for example more than 300 after the Haiti earthquake.<sup>3</sup>

FMTs are groups of health professionals and support staff operating outside their country of origin that provide health care to disaster-affected populations.<sup>4</sup> They are classified according to team size, capability and capacity. Type 1 provides outpatient emergency care, Type 2 outpatient and inpatient surgical emergency care and Type 3 are inpatient referral care teams (capable of complex surgery and high-level medical care). Specialized teams provide specialist care, for example, orthoplastic care, dialysis and care for crush syndrome and maxillo-facial surgery.

Several FMT-related concerns have been reported, including teams arriving in an affected country without approval; lack of coordination, resulting in some areas over served and others underserved; lack of accountability; questionable professional standards of care and an absence of clear exit strategies.<sup>5</sup>

In September 2013, the FMT Working Group of the Global Health Cluster (GHC) published the *Classification and minimum standards for FMTs in sudden onset of*

*disasters*,<sup>5</sup> which outlines six guiding principles and 13 core standards that are to be observed by all FMTs, as well as the minimum technical standards per type of FMT and for each service.

Typhoon Haiyan was declared a Level 3 emergency by the Inter-Agency Standing Committee,<sup>6</sup> calling immediately for international humanitarian assistance. As one of the world's most disaster-prone countries,<sup>7</sup> the Philippines has required FMT assistance in the past, and the Department of Health (DOH) has an established FMT coordinating mechanism which facilitates the entry, processing and accommodation of FMTs once they arrive incountry. However, this system does not assign the teams to their final operational destination.

For the response to Haiyan, the DOH adopted the new classification and registration form and it was the first time the form had been used globally. Although a description of the FMT's response for the first month following Typhoon Haiyan has been published to our knowledge,<sup>8</sup> no study has documented the classification and registration process of FMTs. Therefore, this paper aims to document the new FMT classification and registration process post-Typhoon Haiyan and provide recommendations for the review of the *Classification of minimum standards for FMTs in sudden onset of disasters*.

## METHODS

We conducted a descriptive study on the deployment of all FMTs to Haiyan-affected areas in the Philippines from 8 November 2013 to 30 June 2014. An FMT

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Bureau of International Health Cooperation, Department of Health, Sta Cruz, Manila, Philippines.

<sup>c</sup> Disaster Response and Management, Division of Health Security and Emergencies, World Health Organization Regional Office for the Western Pacific, Manila, Philippines.

Submitted: 16 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_014

coordinating body was established at the national level which comprised representatives from the DOH and the World Health Organization (WHO) Representative Office in the Philippines. This team disseminated the new registration form to all FMTs that had contacted the WHO Western Pacific Regional Office, WHO Representative Office in the Philippines and the DOH from 10 November (two days after the typhoon made landfall). All FMTs were required to register regardless of their location inside or outside the Philippines at the time.

Completed registration forms were submitted via email and entered into an Excel spreadsheet. Information from the weekly monitoring forms and exit reports were also recorded in the spreadsheet along with daily tracking; updating and reporting of FMT activities, including the area of deployment, date of arrival, operational and demobilization dates and the health services being provided. Incomplete data fields were followed up by telephone and email to FMT coordinators and by triangulating information from other sources such as social media and external reports. During the response, this spreadsheet was analysed and presented twice a day on thematic maps posted on the web with the operational status and type of each FMT, location, final destination and expected day of departure. We analysed the final version of the spreadsheet up until 30 June 2014.

Information on non-registered teams was provided from Health Cluster hubs; these non-registered teams were classified using the GHC definitions (i.e. FMT Type 1) even if the number of staff was lower than specified. All information about these teams was added to the spreadsheet. Only the registered and non-registered FMTs known to the national FMT coordinating body were included in this study.

## RESULTS

There were 150 FMTs that provided health services during the Haiyan response; 83 were registered using the new GHC registration form; 67 were not registered. The majority of the 83 registered FMTs were Type 1 (57 fixed and 12 mobile), 11 were Type 2 and two were Type 3. One registered FMT was a specialized FMT, providing ophthalmology services ([Table 1](#)).

All registered FMTs reported their total staff number with two thirds reporting their team composition (54/83, 65%). The average number of personnel in a registered Type 1 fixed, Type 1 mobile, Type 2 and Type 3 FMT were 19, 14, 55 and 83, respectively.

For all registered teams, the mean number of days from arrival in country to being operational (i.e. providing services) was 3.4 days (range: 0–13 days). The Type 3 FMT took 6.5 days due to the complexity of the set up of their required structure. There was no observed difference between Types 1 and Type 2 FMTs on this indicator, despite the more complex structure and higher number of team members of the Type 2 versus Type 1 ([Table 1](#)).

More than two thirds of registered teams ( $n = 55$ ) submitted weekly reports and/or exit reports ([Table 1](#)). These teams reported a total of 193 647 consultations (including 2018 patients referred to higher level health care), 949 major surgical procedures, 4217 minor surgical procedures, 121 Caesarean sections and 1145 vaginal deliveries.

In addition to the 83 registered FMTs, there were 67 FMTs in other operational teams ([Table 2](#)). Most were Type 1 fixed ( $n = 40$ ), 11 were Type 1 mobile, while for 16 (19%) the type was not recorded. Staff numbers was recorded for 30 of these FMTs (45%) with an average staff number of 12. There was an average of three days between arrival and service delivery. None of the 67 non-registered teams submitted reports to the DOH or WHO outlining the services they provided.

## DISCUSSION

Adopting the new classification system for FMTs for the Haiyan response was beneficial as it provided a clear and precise description of the characteristics of each FMT type.<sup>8</sup> It improved the coordination of the teams, especially in allocating the geographical location for each FMT. The registration process occurred before the arrival of some teams in the Philippines, thus reducing the time to become operational after arrival.

Most of the registered Type 2 teams had their own field hospital tents with an operating theatre, and

Table 1. Characteristics of registered FMTs deployed during Typhoon Haiyan, the Philippines, 10 November 2013 to 30 June 2014

Types of registered FMTs	Total	Average number of personnel/FMT	Mean number of days from arrival to being operational (range)	Number of teams reporting activities (%)	Total reported consultations	Total reported minor surgeries	Total reported major surgeries	Normal delivery	Caesarean section	Referrals
Type 1										
Fixed	57	19	3.5 (0–10)	36 (63)	82 850	2845	7	71	2	2018
Mobile	12	14	3 (0–8)	8 (66)	22 892	0	0	0	0	12
Type 2	11	55	3 (0–10)	9 (82)	41 822	1320	490	491	47	93
Type 3	2	83	6.5 (0–13)	2 (100)	46 083	52	452	583	72	N/A
Specialized	1	N/A	N/A	0 (0)	N/A	N/A	N/A	N/A	N/A	N/A
<b>Total</b>	<b>83</b>	<b>N/A</b>	<b>3.4 (0–13)</b>	<b>55 (66)</b>	<b>193 647</b>	<b>4217</b>	<b>949</b>	<b>1145</b>	<b>121</b>	<b>2123</b>

FMT, foreign medical team.

all had prior experience in responding to disasters. They were aware of the mechanisms for coordinating a humanitarian response and were operational within a shorter time frame than Type 1 teams, despite having more staff, equipment and medical supplies. This shorter time frame was also due to the information provided by the teams on the registration forms which allowed the logistics hubs at the Ninoy Aquino International Airport in Manila and Mactan–Cebu International Airport in Cebu to facilitate their arrival efficiently.

Being registered allowed for FMTs to be matched to the health needs in the affected area, which prevented an oversupply of FMTs in one location. Knowing the composition of most registered teams assisted with team assignment and sometimes relocation based on changing needs. The location of all registered teams was mapped using a geographic information system; team location was updated twice daily for the first three weeks, then daily for the following two months and was

posted on the web for the general public. As there were five regions impacted by the typhoon, the maps helped to strategically position the FMTs, in particular Type 2 FMTs, to ensure referral capacity between Type 1 and Type 2. This was not possible for the non-registered FMTs, none of whom had previously been used in a disaster in the Philippines.

Unlike in other sudden onset disasters,<sup>9</sup> the need for surgical and trauma care was limited to the initial two to three weeks post-Haiyan, then changed to a high demand for general practitioners, reproductive and public health specialists. By registering FMTs, the DOH was able to ask teams to exclude trauma specialists and include primary care and public health specialists instead.

All registered teams reported the total number of staff; this information was available for less than half the non-registered FMTs. The average number of staff for the

Table 2. Characteristics of non-registered FMTs deployed during Typhoon Haiyan, the Philippines, 10 November 2013 to 30 June 2014

Type of non-registered FMTs	Total	Number of teams reporting staff numbers (%)	Average number of personnel/FMT	Mean number of days from arrival to being operational (range)
Type 1				
Fixed	40	25 (62)	13	2.8 (0–14)
Mobile	11	2 (18)	11	7
Type 2	0	N/A	N/A	N/A
Type 3	0	N/A	N/A	N/A
Unknown	16	3 (19)	9	N/A
<b>Total</b>	<b>67</b>	<b>30</b>	<b>12</b>	<b>3 (0–14)</b>

FMT, foreign medical team.

registered Type 1 fixed and mobile FMT was 19 and 14, respectively compared with 13 and 11 for the reported non-registered FMTs. FMTs are required to have a minimum number of staff to achieve maximum efficiency and be fully self-sufficient. Because non-registered FMTs had fewer than the required number of staff, the quality of service delivery was questionable. Most of the non-registered FMTs arrived four to six weeks after Haiyan and most of these teams were small with little or no medical equipment so they were only able to operate in the easily accessible areas, such as Tacloban City.

Activity reports and exit forms were submitted to the DOH by most registered FMTs; these were also used to determine if the teams upheld FMT minimum technical standards.<sup>10</sup> The non-registered teams did not provide any reports, although some external reports from these teams were found through social media searches by the DOH and WHO. This highlights a lack of knowledge of the guidelines for FMTs and suggests that most of these non-registered teams were ad hoc and formed rapidly to respond out of benevolence and solidarity. Although noble, they did not comply with the core FMT standards; many were not self-sufficient for drug and medical supplies or food and logistics for their staff, causing additional burden. This influx of non-registered teams was possible due to the waiver for professional license processes and registration fees and the relaxation of visa and immigration regulations for foreign humanitarian workers and volunteers made by the Philippines' Professional Regulations Commission<sup>11</sup> and Bureau of Immigration.<sup>12</sup>

As the registration form was used for the first time, there were some issues with the process. The form did not capture all information on classification and minimum standards, so whether these standards were met could not be assessed. There was no debriefing for FMTs and lack of Internet access at the early stage of the response limited the ability to receive reporting forms that explained some of the incomplete information reported by registered FMTs. Another study concluded that poor data reporting made it impossible to fully assess the performance and activities of FMTs.<sup>7</sup> The lack of information on the non-registered FMTs also limited documentation of the services they provided. Finally, we recommend the development of a FMT global and/or regional platform that would include a roster of

available FMTs to share with WHO Member States such as the Global Foreign Medical Teams Registry.<sup>13</sup>

## CONCLUSION

This study shows that the new FMT classification and registration process enabled the Philippines to strategically deploy international assistance according to the health needs in affected areas. It facilitated faster, more efficient deployment and helped ensure a coordinated, timely and credible response to the disaster.

We recommend that a similar process be used for future responses, although we recommend that the classification of Type 1 FMTs be expanded to differentiate between Type 1 fixed and mobile FMTs as reported in this study. We also recommend mechanisms to enforce the registration of all FMTs, and the timely reporting and monitoring of FMT activities. A standard exit report should be developed and required to be submitted before leaving the country. We also recommend that the registration form include the details of the breakdown of the international staff deployed to be able to check compliance with minimum standards. Finally, we recommend the development of a FMT global and/or regional platform that would include a roster of available FMTs to share with WHO Member States. This will then support countries that request assistance in the future and allow for more accurate and faster waiver processes for visas and licensing. These measures could greatly improve coordination and quality of the health sector response to disaster.

### *Conflict of interest*

None declared.

### *Funding*

None.

### *Acknowledgements*

The authors would like to acknowledge the support of Dr Teodoro Herbosa, Undersecretary of Health, DOH Philippines, for his role as DOH FMT coordinating team leader during Typhoon Haiyan. Likewise, we would



like to thank Dr Julie Lyn Hall, WHO Representative in the Philippines, and Ms Maylene Beltran, Director of the Bureau of International Health Cooperation, DOH Philippines, for their amazing support throughout the response. We would also like to thank all the FMTs that responded.

## References

1. von Schreeb J et al. Foreign field hospitals in the recent sudden-onset disasters in Iran, Haiti, Indonesia, and Pakistan. *Prehospital and Disaster Medicine*, 2008, 23:144–151, discussion 152–153. PMID:18557294
2. Tan YS, von Schreeb J. Humanitarian assistance and accountability: what are we really talking about? *Prehospital and Disaster Medicine*, 2015, 30:264–270. doi:10.1017/S1049023X15000254 PMID:25783966
3. Mac Ginty R, Peterson JP, editors. *The Routledge companion to humanitarian action*. London and New York, Routledge, 2015.
4. Foreign Medical Team Working Group. *Registration and coordination of Foreign Medical Teams responding to sudden onset disasters: the way forward*. Geneva, World Health Organization, 2013 ([http://www.who.int/hac/global\\_health\\_cluster/fmt\\_way\\_forward\\_5may13.pdf](http://www.who.int/hac/global_health_cluster/fmt_way_forward_5may13.pdf), accessed 27 August 2015).
5. Norton I et al. *Classification and minimum standards for Foreign Medical Teams in sudden onset disasters*. Geneva, World Health Organization, 2013 ([http://www.who.int/hac/global\\_health\\_cluster/fmt\\_guidelines\\_september2013.pdf?ua=1](http://www.who.int/hac/global_health_cluster/fmt_guidelines_september2013.pdf?ua=1), accessed 27 August 2015).
6. Gocotano A et al. Is response over? Features of the transition from response to recovery in the health sector post-Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1). doi:10.5365/wpsar.2015.6.2.HYN\_007
7. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1). doi:10.5365/wpsar.2015.6.4.HYN\_026
8. Brolin M, Hawajri O, von Schreeb J. Foreign Medical Teams in the Philippines after Typhoon Haiyan 2013 – who were they, when did they arrive and what did they do? *PLOS Currents Disasters*, 2015. doi: 10.1371/currents.dis.0cadd59590724486bffe9a0340b3e718.
9. Gerdin M, Wladis A, von Schreeb J. Foreign field hospitals after the 2010 Haiti earthquake: how good were we? *Emergency Medicine Journal*, 2012. doi:10.1136/emered-2011-200717
10. Cranmer HH, Biddinger PD. Typhoon Haiyan and the professionalization of disaster response. *New England Journal of Medicine*, 2014, 370:1185–1187. doi:10.1056/NEJMp1401820 PMID:24552286
11. Resolution No PRC. 785 (Series of 2013): Waiver of the requirement of the Special Temporary Permit (STP) for all foreign professionals assisting in the relief, rehabilitation and reconstruction of those areas affected by typhoon "Yolanda". Manila, Professional Regulation Commission, 2013 ([http://www.prc.gov.ph/uploaded/documents/PRC\\_Resolution\\_2013-785.pdf](http://www.prc.gov.ph/uploaded/documents/PRC_Resolution_2013-785.pdf), accessed 27 August 2015).
12. Operations Order No. SBM-2013–027: Guidelines on emergency response travel facilitation (Task Force Yolanda). Manila, Bureau of Immigration, 2013 (<http://immigration.gov.ph/images/Issuances/2013/November2013/3.SBM-2013-027.pdf>, accessed 27 August 2015).
13. *Building a global emergency workforce ready to go*. Geneva, World Health Organization, 2015 (<http://www.who.int/features/2015/vanuatu-emergency-response/en/>, accessed 27 October 2015).

# An assessment of disaster-related mortality post-Haiyan in Tacloban City

Paola Katrina Ching,<sup>ab</sup> Vikki Carr de los Reyes,<sup>b</sup> Ma Nemias Sucaldito<sup>b</sup> and Enrique Tayag<sup>b</sup>

Correspondence to Paola Katrina Ching (email: paolaching@gmail.com).

**Introduction:** Tacloban City was seriously affected by Typhoon Haiyan with 2321 deaths distributed across its 138 villages and subvillages. In January 2014, a team from the Department of Health conducted a mortality assessment to identify risk factors for deaths that occurred during Typhoon Haiyan.

**Methods:** A retrospective case-control study was conducted in the four coastal villages in Tacloban City with the highest numbers of typhoon-associated deaths. A case was defined as a person who died in Tacloban City during Typhoon Haiyan and whose body was recovered and identified. Controls were selected from surviving family members of cases. Information about typhoon-related knowledge, attitudes and practices of the cases was collected using a standardized questionnaire.

**Results:** There were 100 cases and 100 controls included in the study. The cause of death for all cases was drowning, and all bodies were found inside or near their house. Multivariate analysis identified that the significant risk factors for mortality due to Haiyan were not evacuating before the storm hit (odds ratio [OR] = 10.0; 95% confidence interval [CI]: 3.8–29.1) and exiting their house during the storm (OR = 3.6; 95% CI: 1.9–7.1). Proxies reported that all cases had heard about the coming typhoon, but that 88% did not understand the message about the storm surge. Ninety-five per cent of cases did not evacuate because they did not expect the magnitude of storm.

**Conclusion:** Warning messages delivered before and during emergencies should be conveyed in terms understood by the population at risk. We recommend that the results from this study be used to develop more effective messages to be used before future disasters.

The Philippines is one of the most disaster-prone countries in the world due to its geographic location which renders it vulnerable to natural disasters.<sup>1</sup> Between 2000 to 2012, 207 natural disasters were reported to have caused 12 899 deaths.<sup>2</sup>

As early as 4 November 2013, when it was known that Typhoon Haiyan was coming, the Philippine Government held emergency meetings for storm preparation in Tacloban City. Many local officials disseminated storm warnings by personally going to the area to inform the community that a super typhoon would arrive. Local government units designated evacuation areas in each village. Communities were warned that along with a very strong storm, a storm surge might occur, and residents were encouraged to evacuate.

After Typhoon Haiyan hit, Tacloban City was the major focus of devastation because of its location and its large population in low-lying areas. This paper describes

a study conducted in January 2014 by the National Epidemiology Center and the Region 8 Epidemiology and Surveillance Unit team to identify factors for mortality and survival.

## METHODS

The four subvillages with the largest number of Haiyan-related deaths in Tacloban City were purposively sampled: San Jose Balanak, San Jose Beach, Rawis Anibong and Diit. The mortality rates for these subvillages were 40%, 8%, 7% and 2%, respectively (**Figure 1**). All were coastal areas.

To identify cases, we reviewed records from the village secretariat in these four subvillages and the roster of deaths in the Village Affairs Office. Available death certificates provided by relatives of the victims were validated to ensure that the bodies were recovered. Those with pending death certificates were verified at

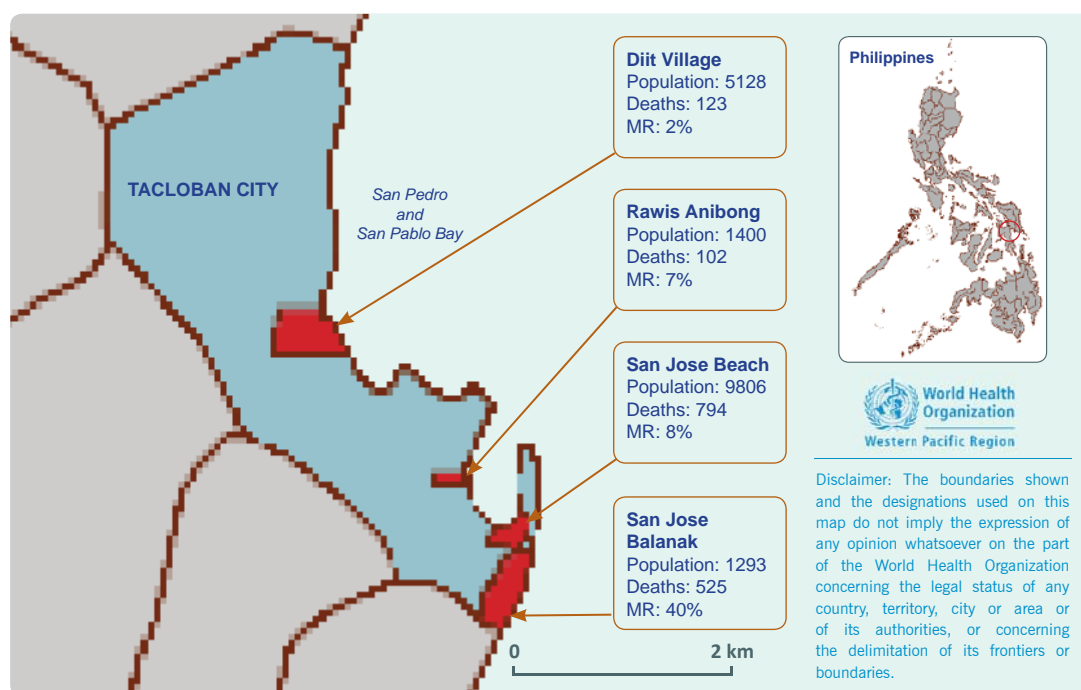
<sup>a</sup> Field Epidemiology Training Program, Epidemiology Bureau, Department of Health, Sta Cruz, Manila, Philippines.

<sup>b</sup> Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 24 May 2015; Published: 00 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_005

Figure 1. Mortality rate by municipality in study sites, Tacloban City, Philippines, January 2014



the Mayor Alfred Social Action Office. We calculated a sample size of 100 using a 95% confidence interval (CI) and a margin of error of 10%.

We conducted a 1:1 unmatched case-control study to identify risk factors associated with mortality from Typhoon Haiyan. A case was defined as a person who died during Typhoon Haiyan on 8 November 2013 and whose body was recovered and identified. A relative of each case was interviewed. A control was defined as a surviving family member of a case who was in Tacloban City at the time that Typhoon Haiyan made landfall. Only those aged more than 10 years were recruited as controls.

Relatives were found by searching in the community and evacuation centres, and were interviewed face-to-face. A knowledge, attitude and practice survey of cases only, through their proxies, was used to identify knowledge of the typhoon, behaviours as the typhoon approached and practices before and during the typhoon. We analysed risk factors using bivariate odds ratio (OR) and logistic regression models in Epi Info version 3.5.4.

## RESULTS

### Descriptive epidemiology

All cases died inside or near their houses with drowning as the documented cause of death. There were 52 cases from San Jose Beach, 34 from San Jose Balanak, eight from Diit and six from Rawis. The median age of cases was 41 years (range: 7 months to 81 years). Sixty-two cases were female (Table 1).

### Case-control study

There were 100 cases and 100 controls in the study. Univariate analysis identified several possible risk factors for mortality due to Typhoon Haiyan. Cases were more likely to be aged 55 years or older (OR = 3.0; 95% CI: 1.7–6.0), unable to swim (OR = 3.5; 95% CI: 1.9–6.5) and living within 50 metres of the sea or ocean (OR = 3.9; 95% CI: 2.1–7.3).

Factors associated with place of refuge during the storm associated with mortality included not going to the designated evacuation centre before the typhoon hit

Table 1. Factors associated with mortality in Tacloban City post-Haiyan, Philippines, January 2014

Characteristic	Cases (n = 100)	Controls (n = 100)	Crude odds ratio (95% confidence interval)	p-value
<b>I. Human profile</b>				
<b>Sex</b>				1.00
Female	62	61	1.0 (0.6–1.9)	
Male	38	39		
<b>Age group ( years)</b>				< 0.001
55 and above	69	41	3.0 (1.7–6.0)	
54 and below	31	59		
<b>Swimming capability</b>				< 0.001
Cannot swim	68	38	3.5 (1.9–6.5)	
Can swim	32	62		
<b>II. Environment</b>				
<b>Structure of house*</b>				0.46
Wood	52	45	1.3 (0.8–2.3)	
Wood and concrete	15	20		
<b>Number of house storeys</b>				
Two-storey	20	25	1.3 (0.7–2.6)	
One-storey	80	75		
<b>Living within 50 metres of sea/ocean</b>				< 0.001
Yes	60	28	3.9 (2.1–7.3)	
No	40	72		
<b>III. Evacuation practices</b>				
<b>Exiting house during storm surge</b>				< 0.001
Yes	69	38	3.6 (1.9–6.8)	
No	31	62		
<b>Evacuated home before storm</b>				< 0.001
No	98	70	21.0 (5.6–132.7)	
Yes	2	30		

\* Missing value refers to concrete.

(OR = 21.0; 95% CI: 5.6–132.7) and exiting the house during the storm (OR = 3.6; 95% CI: 1.9–6.8). The material from which the houses were made and whether it was single or two-storey was not associated with death (Table 1).

The multivariate model identified two significant risk factors for death due to Typhoon Haiyan: not going to the designated evacuation centre before the typhoon (adjusted OR [aOR] = 10.0; 95% CI: 3.8–29.1) and exiting the house during the storm (aOR = 3.6; 95% CI = 1.9–7.1).

### Knowledge, attitude and practices survey

According to the proxy interviews, all cases knew the storm was approaching. A large percentage of

interviewees (89%) stated that although the cases were warned about the storm surge they did not understand what this meant. Eighty per cent of cases were first informed about the storm surge through television and 10% by announcements from local officials using an outdoor speaker. Most (90%) reported that the cases did not know that staying in their place of residence was unsafe; 56% knew the designated place of evacuation, but most (98%) did not evacuate.

According to the interviewees, 76% of cases did not know about pre-existing village disaster plans. However, 58% reported that the cases had prepared for the storm, including 44 cases who stored food and water and eight who packed bags for evacuation. Among those who did not evacuate ( $n = 98$ ), and who provided a reason ( $n = 74$ ), it was reported that 55 cases were surprised

by the magnitude of the storm, 19 stayed due to anxiety about the security of their home and belongings and 10 believed that their houses were sturdy enough to withstand the storm.

## DISCUSSION

Evacuation is an integral part of disaster management and can minimize deaths and property damage.<sup>2</sup> According to our study, not evacuating one's home before the storm, despite official recommendations, was the greatest risk factor for mortality during Typhoon Haiyan. In a study in the Philippines during Typhoon Bopha in 2013, a risk factor was no knowledge of the coming storm (MJ Zapanta, Department of Health, personal communication, 2013). Some villagers reported not vacating their residence due to anxiety about safeguarding their home and belongings. Other studies have also found that a desire to keep one's belongings secure is a common reason for not evacuating.<sup>3</sup> Evacuation orders for this kind of major storm should be compulsory, and warnings should emphasize that storms of this magnitude can cause death or injury.

Although it was reported that messages about the coming storm were received, it was also reported that the message to evacuate was not understood. The term "storm surge" was used to warn the public before Typhoon Haiyan, but many did not understand what this meant. Local officials tried to persuade people to evacuate through radio, television and personal roaming even during the arrival of the storm, but they kept using the words storm surge. Those who tried to explain it, described it as a "tsunami-like" effect of the sea. It would have been better if the term used was from the local dialect and a comprehensive description of what happens was provided.

Other studies have found flood-related deaths can be attributed to risk-taking behaviour during disasters.<sup>4</sup> Leaving the house during the typhoon likely exposed people to dangerous winds and water. Swimming inability was a risk factor for increased mortality among females in the 2004 Indian Ocean Tsunami<sup>5</sup> and after a tsunami in Indonesia.<sup>6</sup> We did not identify swimming as an independent risk factor in our study; however, 68% of cases compared with 38% of controls, were not able to swim.

Other factors associated with death during disasters include age, gender, physical and mental health history, co-morbidities and activity and behaviour.<sup>7</sup> In this study, we found older age to be a risk factor on bivariate analysis and this increased risk may have been due to underlying medical conditions aggravated during the stressful situation.<sup>6</sup> Another study reported that older people experienced difficulties in receiving and understanding disaster warnings.<sup>8</sup> This is consistent with the natural disaster trend where younger and older populations have increased risk of death.<sup>9</sup> Being female was identified as a risk factor in the 2004 tsunami affecting Indonesia, India and Sri Lanka<sup>10</sup> but not in this study. We hypothesize that since the study area was a fishing village, men were the predominant residents. However, the small sample size of this study may have limited our results.

This study has some limitations. First, we were limited in our control selection and therefore used a family member of the case. We found it difficult to obtain other controls because of the situation post-disaster and the displaced population. Second, the list of deaths was limited to those reported at the Village Affairs Office with possible data varying from the actual number of deaths; it is possible that some deaths had not been documented. Third, cause of death was based on what was written on the medical certificate, and it was not verified if a trauma occurred or if an underlying medical condition was present. Fourth, we only included four villages in the city with the most cases due to limited time, resources and poor accessibility. Therefore, these results may not be representative of other cities affected by the storm or other people who died in the storm. Fifth, using proxy respondents for cases may have affected the accuracy of information due to recall bias or lack of knowledge; however, there was no other way to obtain information on the cases. Despite these limitations, our findings have been verified elsewhere.<sup>7</sup>

In conclusion, this study identified leaving the house during the typhoon and not evacuating before Haiyan hit as risk factors associated with mortality in Tacloban City. This suggests that these types of deaths could be minimized by reducing these behavioural risks, by using warning messages understood by the population at risk. We recommend that the results from



this study be used to develop more effective pre-disaster messages.

### Conflicts of interest

None declared.

### Funding

This study was funded by the Philippine Department of Health.

### Acknowledgements

We are grateful for the support of the Center for Health and Development-Eastern Visayas, Regional Epidemiology and Surveillance Unit of Region 8, local government of Tacloban City and the villagers of Tacloban City. We also thank the participants of the study and Mr Julius Velasquez who assisted in the investigation, as well as Dr Michael O'Reilly for his review of this article.

### References

1. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. *Natural disasters at a glance*. Manila, Senate Economic Planning Office, 2013 ([http://www.senate.gov.ph/publications/AAG%202013-04%20-%20Natural%20Disasters\\_final.pdf](http://www.senate.gov.ph/publications/AAG%202013-04%20-%20Natural%20Disasters_final.pdf), accessed 21 August 2015)
3. Na L, Xueyen S, Mingliang Q. A bi-objective evacuation routing engineering model with secondary evacuation expected costs. *Systems Engineering Procedia*, 2012, 5:1–7. doi:10.1016/j.sepro.2012.04.001
4. Baker EJ. Hurricane Evacuation Behavior. *International Journal of Mass Emergencies and Disasters*, 1991, 9:287–310.
5. Piatyszek E, Karagiannis G. Model-based approach for a systematic risk analysis of local flood emergency operation plans: a first step toward a decision support system. *Natural Hazards*, 2012, 61:1443–1462. doi:10.1007/s11069-011-0079-z
6. Linnan M et al. *Protective effect of swimming in a tsunami disaster and its protection of caretakers and children*. Danang, World Conference on Drowning Prevention, 10–13 May 2011 ([http://www.worldconferenceondrowningprevention2011.org/SiteMedia/w3svc1092/Uploads/Documents/WCDP2011\\_Disaster\\_Linnan\\_p317\\_Abstract.pdf](http://www.worldconferenceondrowningprevention2011.org/SiteMedia/w3svc1092/Uploads/Documents/WCDP2011_Disaster_Linnan_p317_Abstract.pdf), accessed 4 September 2015).
7. Guha-Sapir D et al. *Risk factors for mortality and Injury: post-tsunami epidemiological findings from Tamil Nadu*. Brussels, Center for Research on the Epidemiology of Disasters, 2006 ([http://www.preventionweb.net/files/8817\\_RiskFactorsMortalityInjury.pdf](http://www.preventionweb.net/files/8817_RiskFactorsMortalityInjury.pdf), accessed 21 August 2015).
8. *Tamil Nadu Human Development Report*. New Delhi, Government of Tamil Nadu, 2003 ([http://hdr.undp.org/sites/default/files/tn\\_nhdr\\_2003.pdf](http://hdr.undp.org/sites/default/files/tn_nhdr_2003.pdf), accessed 21 August 2015).
9. Chou YJ et al. Who is at risk of death in an earthquake? *American Journal of Epidemiology*, 2004, 160:688–695. doi:10.1093/aje/kwh270 pmid:15383413
10. *The tsunami's impact on women, Oxfam briefing note*. London, Oxfam International, 2005 (<http://policy-practice.oxfam.org.uk/publications/the-tsunamis-impact-on-women-115038>, accessed 21 August 2015).

# An assessment of disaster-related mortality post-Haiyan in Tacloban City

Paola Katrina Ching,<sup>ab</sup> Vikki Carr de los Reyes,<sup>b</sup> Ma Nemia Sucaldito<sup>b</sup> and Enrique Tayag<sup>b</sup>

Correspondence to Paola Katrina Ching (email: paolaching@gmail.com).

**Introduction:** Tacloban City was seriously affected by Typhoon Haiyan with 2321 deaths distributed across its 138 villages and subvillages. In January 2014, a team from the Department of Health conducted a mortality assessment to identify risk factors for deaths that occurred during Typhoon Haiyan.

**Methods:** A retrospective case-control study was conducted in the four coastal villages in Tacloban City with the highest numbers of typhoon-associated deaths. A case was defined as a person who died in Tacloban City during Typhoon Haiyan and whose body was recovered and identified. Controls were selected from surviving family members of cases. Information about typhoon-related knowledge, attitudes and practices of the cases was collected using a standardized questionnaire.

**Results:** There were 100 cases and 100 controls included in the study. The cause of death for all cases was drowning, and all bodies were found inside or near their house. Multivariate analysis identified that the significant risk factors for mortality due to Haiyan were not evacuating before the storm hit (odds ratio [OR] = 10.0; 95% confidence interval [CI]: 3.8–29.1) and exiting their house during the storm (OR = 3.6; 95% CI: 1.9–7.1). Proxies reported that all cases had heard about the coming typhoon, but that 88% did not understand the message about the storm surge. Ninety-five per cent of cases did not evacuate because they did not expect the magnitude of storm.

**Conclusion:** Warning messages delivered before and during emergencies should be conveyed in terms understood by the population at risk. We recommend that the results from this study be used to develop more effective messages to be used before future disasters.

The Philippines is one of the most disaster-prone countries in the world due to its geographic location which renders it vulnerable to natural disasters.<sup>1</sup> Between 2000 to 2012, 207 natural disasters were reported to have caused 12 899 deaths.<sup>2</sup>

As early as 4 November 2013, when it was known that Typhoon Haiyan was coming, the Philippine Government held emergency meetings for storm preparation in Tacloban City. Many local officials disseminated storm warnings by personally going to the area to inform the community that a super typhoon would arrive. Local government units designated evacuation areas in each village. Communities were warned that along with a very strong storm, a storm surge might occur, and residents were encouraged to evacuate.

After Typhoon Haiyan hit, Tacloban City was the major focus of devastation because of its location and its large population in low-lying areas. This paper describes

a study conducted in January 2014 by the National Epidemiology Center and the Region 8 Epidemiology and Surveillance Unit team to identify factors for mortality and survival.

## METHODS

The four subvillages with the largest number of Haiyan-related deaths in Tacloban City were purposively sampled: San Jose Balanak, San Jose Beach, Rawis Anibong and Diit. The mortality rates for these subvillages were 40%, 8%, 7% and 2%, respectively (**Figure 1**). All were coastal areas.

To identify cases, we reviewed records from the village secretariat in these four subvillages and the roster of deaths in the Village Affairs Office. Available death certificates provided by relatives of the victims were validated to ensure that the bodies were recovered. Those with pending death certificates were verified at

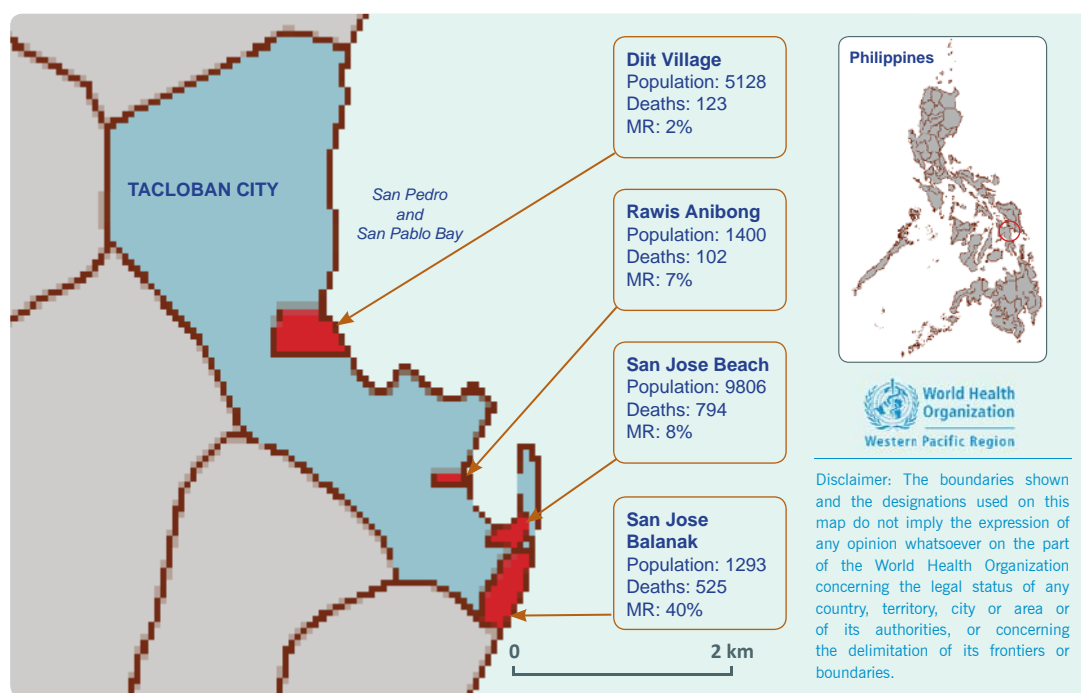
<sup>a</sup> Field Epidemiology Training Program, Epidemiology Bureau, Department of Health, Sta Cruz, Manila, Philippines.

<sup>b</sup> Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 24 May 2015; Published: 00 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_005

Figure 1. Mortality rate by municipality in study sites, Tacloban City, Philippines, January 2014



the Mayor Alfred Social Action Office. We calculated a sample size of 100 using a 95% confidence interval (CI) and a margin of error of 10%.

We conducted a 1:1 unmatched case-control study to identify risk factors associated with mortality from Typhoon Haiyan. A case was defined as a person who died during Typhoon Haiyan on 8 November 2013 and whose body was recovered and identified. A relative of each case was interviewed. A control was defined as a surviving family member of a case who was in Tacloban City at the time that Typhoon Haiyan made landfall. Only those aged more than 10 years were recruited as controls.

Relatives were found by searching in the community and evacuation centres, and were interviewed face-to-face. A knowledge, attitude and practice survey of cases only, through their proxies, was used to identify knowledge of the typhoon, behaviours as the typhoon approached and practices before and during the typhoon. We analysed risk factors using bivariate odds ratio (OR) and logistic regression models in Epi Info version 3.5.4.

## RESULTS

### Descriptive epidemiology

All cases died inside or near their houses with drowning as the documented cause of death. There were 52 cases from San Jose Beach, 34 from San Jose Balanak, eight from Diit and six from Rawis. The median age of cases was 41 years (range: 7 months to 81 years). Sixty-two cases were female (Table 1).

### Case-control study

There were 100 cases and 100 controls in the study. Univariate analysis identified several possible risk factors for mortality due to Typhoon Haiyan. Cases were more likely to be aged 55 years or older (OR = 3.0; 95% CI: 1.7–6.0), unable to swim (OR = 3.5; 95% CI: 1.9–6.5) and living within 50 metres of the sea or ocean (OR = 3.9; 95% CI: 2.1–7.3).

Factors associated with place of refuge during the storm associated with mortality included not going to the designated evacuation centre before the typhoon hit

Table 1. Factors associated with mortality in Tacloban City post-Haiyan, Philippines, January 2014

Characteristic	Cases (n = 100)	Controls (n = 100)	Crude odds ratio (95% confidence interval)	p-value
<b>I. Human profile</b>				
<b>Sex</b>				1.00
Female	62	61	1.0 (0.6–1.9)	
Male	38	39		
<b>Age group ( years)</b>				< 0.001
55 and above	69	41	3.0 (1.7–6.0)	
54 and below	31	59		
<b>Swimming capability</b>				< 0.001
Cannot swim	68	38	3.5 (1.9–6.5)	
Can swim	32	62		
<b>II. Environment</b>				
<b>Structure of house*</b>				0.46
Wood	52	45	1.3 (0.8–2.3)	
Wood and concrete	15	20		
<b>Number of house storeys</b>				
Two-storey	20	25	1.3 (0.7–2.6)	
One-storey	80	75		
<b>Living within 50 metres of sea/ocean</b>				< 0.001
Yes	60	28	3.9 (2.1–7.3)	
No	40	72		
<b>III. Evacuation practices</b>				
<b>Exiting house during storm surge</b>				< 0.001
Yes	69	38	3.6 (1.9–6.8)	
No	31	62		
<b>Evacuated home before storm</b>				< 0.001
No	98	70	21.0 (5.6–132.7)	
Yes	2	30		

\* Missing value refers to concrete.

(OR = 21.0; 95% CI: 5.6–132.7) and exiting the house during the storm (OR = 3.6; 95% CI: 1.9–6.8). The material from which the houses were made and whether it was single or two-storey was not associated with death (Table 1).

The multivariate model identified two significant risk factors for death due to Typhoon Haiyan: not going to the designated evacuation centre before the typhoon (adjusted OR [aOR] = 10.0; 95% CI: 3.8–29.1) and exiting the house during the storm (aOR = 3.6; 95% CI = 1.9–7.1).

### Knowledge, attitude and practices survey

According to the proxy interviews, all cases knew the storm was approaching. A large percentage of

interviewees (89%) stated that although the cases were warned about the storm surge they did not understand what this meant. Eighty per cent of cases were first informed about the storm surge through television and 10% by announcements from local officials using an outdoor speaker. Most (90%) reported that the cases did not know that staying in their place of residence was unsafe; 56% knew the designated place of evacuation, but most (98%) did not evacuate.

According to the interviewees, 76% of cases did not know about pre-existing village disaster plans. However, 58% reported that the cases had prepared for the storm, including 44 cases who stored food and water and eight who packed bags for evacuation. Among those who did not evacuate ( $n = 98$ ), and who provided a reason ( $n = 74$ ), it was reported that 55 cases were surprised

by the magnitude of the storm, 19 stayed due to anxiety about the security of their home and belongings and 10 believed that their houses were sturdy enough to withstand the storm.

## DISCUSSION

Evacuation is an integral part of disaster management and can minimize deaths and property damage.<sup>2</sup> According to our study, not evacuating one's home before the storm, despite official recommendations, was the greatest risk factor for mortality during Typhoon Haiyan. In a study in the Philippines during Typhoon Bopha in 2013, a risk factor was no knowledge of the coming storm (MJ Zapanta, Department of Health, personal communication, 2013). Some villagers reported not vacating their residence due to anxiety about safeguarding their home and belongings. Other studies have also found that a desire to keep one's belongings secure is a common reason for not evacuating.<sup>3</sup> Evacuation orders for this kind of major storm should be compulsory, and warnings should emphasize that storms of this magnitude can cause death or injury.

Although it was reported that messages about the coming storm were received, it was also reported that the message to evacuate was not understood. The term "storm surge" was used to warn the public before Typhoon Haiyan, but many did not understand what this meant. Local officials tried to persuade people to evacuate through radio, television and personal roaming even during the arrival of the storm, but they kept using the words storm surge. Those who tried to explain it, described it as a "tsunami-like" effect of the sea. It would have been better if the term used was from the local dialect and a comprehensive description of what happens was provided.

Other studies have found flood-related deaths can be attributed to risk-taking behaviour during disasters.<sup>4</sup> Leaving the house during the typhoon likely exposed people to dangerous winds and water. Swimming inability was a risk factor for increased mortality among females in the 2004 Indian Ocean Tsunami<sup>5</sup> and after a tsunami in Indonesia.<sup>6</sup> We did not identify swimming as an independent risk factor in our study; however, 68% of cases compared with 38% of controls, were not able to swim.

Other factors associated with death during disasters include age, gender, physical and mental health history, co-morbidities and activity and behaviour.<sup>7</sup> In this study, we found older age to be a risk factor on bivariate analysis and this increased risk may have been due to underlying medical conditions aggravated during the stressful situation.<sup>6</sup> Another study reported that older people experienced difficulties in receiving and understanding disaster warnings.<sup>8</sup> This is consistent with the natural disaster trend where younger and older populations have increased risk of death.<sup>9</sup> Being female was identified as a risk factor in the 2004 tsunami affecting Indonesia, India and Sri Lanka<sup>10</sup> but not in this study. We hypothesize that since the study area was a fishing village, men were the predominant residents. However, the small sample size of this study may have limited our results.

This study has some limitations. First, we were limited in our control selection and therefore used a family member of the case. We found it difficult to obtain other controls because of the situation post-disaster and the displaced population. Second, the list of deaths was limited to those reported at the Village Affairs Office with possible data varying from the actual number of deaths; it is possible that some deaths had not been documented. Third, cause of death was based on what was written on the medical certificate, and it was not verified if a trauma occurred or if an underlying medical condition was present. Fourth, we only included four villages in the city with the most cases due to limited time, resources and poor accessibility. Therefore, these results may not be representative of other cities affected by the storm or other people who died in the storm. Fifth, using proxy respondents for cases may have affected the accuracy of information due to recall bias or lack of knowledge; however, there was no other way to obtain information on the cases. Despite these limitations, our findings have been verified elsewhere.<sup>7</sup>

In conclusion, this study identified leaving the house during the typhoon and not evacuating before Haiyan hit as risk factors associated with mortality in Tacloban City. This suggests that these types of deaths could be minimized by reducing these behavioural risks, by using warning messages understood by the population at risk. We recommend that the results from



this study be used to develop more effective pre-disaster messages.

### Conflicts of interest

None declared.

### Funding

This study was funded by the Philippine Department of Health.

### Acknowledgements

We are grateful for the support of the Center for Health and Development-Eastern Visayas, Regional Epidemiology and Surveillance Unit of Region 8, local government of Tacloban City and the villagers of Tacloban City. We also thank the participants of the study and Mr Julius Velasquez who assisted in the investigation, as well as Dr Michael O'Reilly for his review of this article.

### References

1. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Supp 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. *Natural disasters at a glance*. Manila, Senate Economic Planning Office, 2013 ([http://www.senate.gov.ph/publications/AAG%202013-04%20-%20Natural%20Disasters\\_final.pdf](http://www.senate.gov.ph/publications/AAG%202013-04%20-%20Natural%20Disasters_final.pdf), accessed 21 August 2015)
3. Na L, Xueyen S, Mingliang Q. A bi-objective evacuation routing engineering model with secondary evacuation expected costs. *Systems Engineering Procedia*, 2012, 5:1–7. doi:10.1016/j.sepro.2012.04.001
4. Baker EJ. Hurricane Evacuation Behavior. *International Journal of Mass Emergencies and Disasters*, 1991, 9:287–310.
5. Piatyszek E, Karagiannis G. Model-based approach for a systematic risk analysis of local flood emergency operation plans: a first step toward a decision support system. *Natural Hazards*, 2012, 61:1443–1462. doi:10.1007/s11069-011-0079-z
6. Linnan M et al. *Protective effect of swimming in a tsunami disaster and its protection of caretakers and children*. Danang, World Conference on Drowning Prevention, 10–13 May 2011 ([http://www.worldconferenceondrowningprevention2011.org/SiteMedia/w3svc1092/Uploads/Documents/WCDP2011\\_Disaster\\_Linnan\\_p317\\_Abstract.pdf](http://www.worldconferenceondrowningprevention2011.org/SiteMedia/w3svc1092/Uploads/Documents/WCDP2011_Disaster_Linnan_p317_Abstract.pdf), accessed 4 September 2015).
7. Guha-Sapir D et al. *Risk factors for mortality and Injury: post-tsunami epidemiological findings from Tamil Nadu*. Brussels, Center for Research on the Epidemiology of Disasters, 2006 ([http://www.preventionweb.net/files/8817\\_RiskFactorsMortalityInjury.pdf](http://www.preventionweb.net/files/8817_RiskFactorsMortalityInjury.pdf), accessed 21 August 2015).
8. *Tamil Nadu Human Development Report*. New Delhi, Government of Tamil Nadu, 2003 ([http://hdr.undp.org/sites/default/files/tn\\_nhdr\\_2003.pdf](http://hdr.undp.org/sites/default/files/tn_nhdr_2003.pdf), accessed 21 August 2015).
9. Chou YJ et al. Who is at risk of death in an earthquake? *American Journal of Epidemiology*, 2004, 160:688–695. doi:10.1093/aje/kwh270 pmid:15383413
10. *The tsunami's impact on women*, Oxfam briefing note. London, Oxfam International, 2005 (<http://policy-practice.oxfam.org.uk/publications/the-tsunamis-impact-on-women-115038>, accessed 21 August 2015).

# Rapid health assessments of evacuation centres in areas affected by Typhoon Haiyan

Ruth Alma Ramos,<sup>ab</sup> Vikki Carr de los Reyes,<sup>b</sup> Ma Nemia Sucaldito<sup>b</sup> and Enrique Tayag<sup>b</sup>

Correspondence to Ruth Alma Ramos (email: ruthmd\_amos@yahoo.com).

**Introduction:** Typhoon Haiyan caused thousands of deaths and catastrophic destruction, leaving many homeless in Region 8 of the Philippines. A team from the Philippine Field Epidemiology Training Program conducted a rapid health assessment survey of evacuation centres severely affected by Haiyan.

**Methods:** A descriptive study was conducted whereby a convenience sample of evacuation centres were assessed on the number of toilets per evacuee, sanitation, drinking-water, food supply source and medical services.

**Results:** Of the 20 evacuation centres assessed, none had a designated manager. Most were located in schools (70%) with the estimated number of evacuees ranging from 15 to 5000 per centre. Only four (20%) met the World Health Organization standard for number of toilets per evacuee; none of the large evacuation centres had even half the recommended number of toilets. All of the evacuation centres had available drinking-water. None of the evacuation centres had garbage collection, vector control activities or standby medical teams. Fourteen (70%) evacuation centres had onsite vaccination activities for measles, tetanus and polio virus. Many evacuation centres were overcrowded.

**Conclusion:** Evacuation centres are needed in almost every disaster. They should be safely located and equipped with the required amenities. In disaster-prone areas such as the Philippines, schools and community centres should not be designated as evacuation centres unless they are equipped with adequate sanitation services.

Immediately after a disaster, a rapid health assessment is usually conducted to determine basic health needs of the affected population to identify response priorities. Without rapid assessments, significant gaps or overlapping assistance may occur that can further burden the affected population.<sup>1</sup> Rapid health assessments have been conducted by the Philippine Field Epidemiology Training Program (FETP) since 1990 for events such as typhoons, volcanic eruptions, flash floods and man-made disasters such as a chemical spill from a sunken ship, a trash slide in a dump site and the post-armed conflict in Zamboanga City.

Prior to Typhoon Haiyan in November 2013, evacuation centres in schools, churches and public buildings were designated by the local government, and the public was encouraged to evacuate. In November 2013, two weeks after Typhoon Haiyan, a team from the Philippine FETP conducted a rapid health assessment of evacuation centres in Region 8 to assess

the health needs of the affected population, to inspect the facilities available at each evacuation centre and to make recommendations for improvements to evacuation centres.

## METHODS

We conducted rapid health assessments between 22 November and 1 December 2013, two weeks after Typhoon Haiyan's landfall. We used the health assessment tool that had been developed by previous FETP fellows, although additional variables were added that were specific to the Haiyan response. The assessment tool collected information on demographics, nutritional and immunization status of the evacuees, food and water sources, living conditions, health services and environmental sanitation of each evacuation centre. A guide on data collection, including the definition of terms, was produced and distributed to all assessors. Two teams of five members conducted the evaluations.

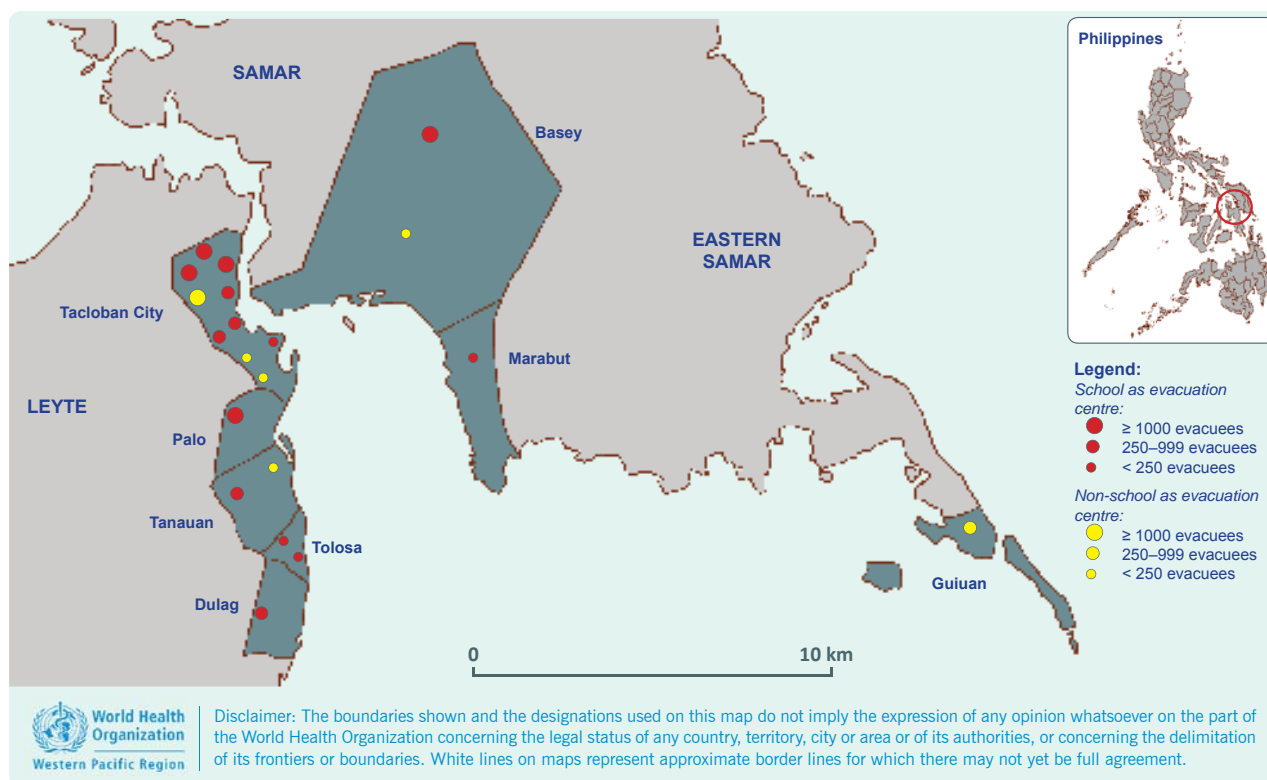
<sup>a</sup> Field Epidemiology Training Program, Epidemiology Bureau, Department of Health, Sta Cruz, Manila, Philippines.

<sup>b</sup> Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 29 April 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_003

Figure 1. Location of evacuation centres assessed by type and population size, post-Typhoon Haiyan, Region 8, the Philippines, November 2013



Twenty evacuation centres that were readily accessible in Region 8 (the area of maximum typhoon devastation) were selected by convenience sampling. Face-to-face interviews were conducted with either the village leader, school principal or a teacher, government staff and evacuees in each evacuation centre. Members of the evaluation team counted toilets, verified food and water sources and conducted a visual inspection. Evacuation centres were divided into large ( $\geq 1000$  evacuees), medium (250–999) and small ( $< 250$ ) facilities. The number of toilets was compared to the World Health Organization (WHO) standard for toilet volume (1 latrine:20 people).<sup>2</sup> Data were entered and analysed using Microsoft Excel.

## RESULTS

Of the 20 evacuation centres assessed, 14 (70%) were schools and six (30%) non-schools (tent city, church, orphanage, civic/convention centres and barge). The estimated number of evacuees in each evacuation centre ranged from 15 to 5000 (Figure 1). There were six large, six medium and eight small evacuation centres (Table 1).

None of the evacuation centres had a designated manager or a registry list of evacuees. Therefore data on the age, gender, former residence or health status of evacuees were unavailable. Similarly, documentation of the number of deaths, number of injuries and number of medical consultations was not available, even in centres where medical consultation teams had visited.

Four of the 20 evacuation centres (20%) met the WHO standard for number of toilets. Nine (45%) had at least half the recommended number of toilets; none of the large evacuation centres had at least half the recommended number of toilets. Two of the 14 schools (14%) and two of the six non-schools (33%) had an adequate number of toilets per evacuee (Table 1).

All evacuation centres had available drinking-water; nine (45%) had a functioning local water system, three had rationed bottled water, five were using water bladders (refilled with local spring water), one was using collapsible refillable water containers and one had a deep well (Table 1). None of the evacuation centres had performed post-disaster water quality testing at the time of assessment.

Table 1. Needs assessment and services available in evacuation centres post-Typhoon Haiyan, Region 8, the Philippines, November 2013

Estimated population	Evacuation centres			Services available							
	No.	Type	Population	Toilet: population*	Water source	Food supply	Garbage collection	Vector control	Standby medical team	Immunization activities†	Mental health
Large (≥ 1000)	1	School	5000	1:179	Water bladder	Regular	None	None	None	Yes	No
	2	School	1132	1:75	Bottled water	No	None	None	None	Yes	No
	3	School	1200	1:43	Collapsible container	No	None	None	None	Yes	No
	4	School	2000	1:77	Local system	Regular	None	None	None	No	Yes
	5	Convention centre	2000	1:111	Water bladder	Regular	None	None	None	Yes	No
	6	School	1000	1:91	Deep well	Regular	None	None	None	Yes	No
Medium (250–999)	7	School	910	1:25	Local system	Regular	None	None	None	No	No
	8	School	637	1:40	Rationed bottled water	No	None	None	None	Yes	No
	9	School	421	1:42	Local system	No	None	None	None	Yes	No
	10	School	473	1:59	Local system	Sporadic	None	None	None	Yes	No
	11	School	250	1:13	Local system	Regular	None	None	None	Yes	No
	12	Tent city	427	1:15	Water bladder	Regular	None	None	None	No	Yes
Small (< 250)	13	Civic centre	200	1:200	Local system	Sporadic	None	None	None	Yes	No
	14	Barge	200	1:20	Local system	No	None	None	None	No	No
	15	Orphanage	120	1:60	Local system	No	None	None	None	Yes	Yes
	16	Church	100	1:100	Rationed water from DSWD	Regular	None	None	None	No	No
	17	School	80	1:27	Water bladder	Sporadic	None	None	None	Yes	No
	18	School	68	1:34	Local system	No	None	None	None	Yes	No
	19	School	15	1:4	Water bladder	Sporadic	None	None	None	Yes	No
	20	School	45	1:23	Rationed bottled water	Sporadic	None	None	None	No	No

\* WHO Standard is 1 toilet to 20 people.<sup>3</sup>

† Immunization activities include measles, tetanus and oral polio virus vaccination.

DSWD, Department of Social Welfare and Development.

Seven (35%) evacuation centres did not provide food to evacuees, including two of the five large evacuation centres (40%). Four of the eight (50%) small evacuation centres provided food irregularly. None of the evacuation centres had garbage collection, vector control activities or standby medical teams (Table 1).

Fourteen (70%) evacuation centres had onsite vaccination activities for measles, tetanus and polio. Four of the five (80%) large evacuation centres conducted vaccination activities. Three evacuation centres (15%) had mental health services and psychosocial services (Table 1).

Many evacuation centres appeared overcrowded. At one evacuation centre at a school in Tacloban City, there was an average of 10 families per room. Some

schools serving as evacuation centres were also damaged by the typhoon.

## DISCUSSION

In a study of the 2011 Great East Japan Earthquake, it was found that three factors influenced the health of evacuees: (1) presence of persons in charge of providing health services; (2) size of evacuation centre; and (3) status of water supply.<sup>3</sup> In this study, there were no managers at any evacuation centre and no list of evacuees. The size of the evacuation centres varied, yet the supply of drinking-water was adequate.

Although managing evacuation centres is a local government unit's responsibility in the Philippines, most of the affected municipalities suffered loss of staff as a

result of Haiyan and so their capacity to provide services was diminished. Having managers who monitored the migration in and out of evacuation centres and the services that were being provided would have allowed for initial health assessments to provide better information on the population. Managers could also have assisted in the efficient provision of services from governmental health staff and nongovernmental organizations. In a survey conducted in evacuation centres two weeks after the Great East Japan Earthquake,<sup>3</sup> it was found that promptly placing persons in charge of health matters at evacuation centres was a practicable and effective measure, and allocating of at least one such person per 50 evacuees was desirable. Another study reported that initially after an earthquake, most evacuation centres were managed by local teachers or volunteers; however, as the evacuation period lengthened, evacuees themselves started taking initiatives to manage the centres.<sup>4</sup>

The size of evacuation centres was an important determinant of quality of services provided in Japan post-disaster,<sup>3</sup> with smaller centres offering better health conditions for residents. Smaller centres seemed to function better due to better interpersonal relationships and an environment that enabled the emergence of strong leadership.<sup>5</sup> In our study, service quality varied among centres of all sizes, with the large centres providing good vaccination services but limited food and poor sanitation services. None of the evacuation centres had garbage disposal or vector control activities; therefore, evacuees were at risk of contracting diarrhoeal and vector-borne diseases. The situation of overcrowding in evacuation centres and presence of breeding sites for mosquitoes may lead to increased transmission of diseases with the potential for large outbreaks.

Although all evacuation centres in this study had access to water, no water quality testing had been conducted at the time of the assessments. Minimum standards for humanitarian services include not only a sufficient quantity of water but also disinfection of the water sources to reduce risk of contamination and the threat of an outbreak of diarrhoeal disease.<sup>6</sup> Food supply varied in evacuation centres. Lack of food is particularly problematic in large evacuation centres where alternative sources of food may be limited. Food was more commonly

supplied to school evacuation centres compared with non-school centres.

Following the 2004 tsunami in Aceh, Indonesia, community-based health evaluations concluded that access to sanitation and clean water as well as primary care services were the most essential health-related services.<sup>7</sup> One toilet per 20 individuals is the recommended ratio in an evacuation centre housing people for more than a few days,<sup>2</sup> yet in our study, none of the large evacuation centres met this recommended ratio. Schools are often used as evacuation centres in the Philippines as these are thought to have the capacity to shelter large numbers of people. However, toilet volume in schools is designed to accommodate a specific number of students for a limited number of hours each day. Only 14% of schools had the recommended number of toilets per person.

There were some limitations to this study. The assessments were conducted quickly, therefore, accuracy of the data may have been compromised. Managers were not in place in evacuation centres; hence, the information obtained was prone to bias as many estimates were used. There could have been an underestimation of the volume of services needed because only an estimation of population figures was used. The centres were purposively chosen and therefore may not have been representative of all evacuation centres. Certain centres were not assessed due to issues of access and security.

Evacuation centres are needed in almost every disaster. In disaster-prone areas in the Philippines, evacuation centres should be safely located and equipped with adequate services and a proper management structure. As evacuation centres are already identified in every municipality in the Philippines, we recommend that a management team be assigned to each evacuation centre with staff from municipal health offices and rural health units. Since schools are primarily used as evacuation centres in the Philippines, school principals or head teachers could also be on the management team. Only schools equipped with adequate sanitation services should be used as evacuation centres.

Registration and information management is important in every evacuation centre. A logbook should



be available at all evacuation centres to register all evacuees indicating the name, age, sex, family head, place of origin and members of the family. This would give details on the profile of disaster victims and of family members with special needs. The goal of better managed evacuation centres can be achieved through advanced planning and preparation that include well-defined leadership and responsibility.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

We are grateful for the cooperation and support of the head and staff of Regional Epidemiology and Surveillance Unit from Region 8, FETP Batches 23 and 24 and FETP graduates who conducted these assessments and the participants from the evacuation centres.

We also thank Dr Michael O'Reilly for his review.

### References

1. Arii M. Rapid assessment in disasters. *Japan Medical Association Journal*, 2013, 56(1):19–24 ([https://www.med.or.jp/english/journal/pdf/2013\\_01/019\\_024.pdf](https://www.med.or.jp/english/journal/pdf/2013_01/019_024.pdf), accessed 18 August 2015).
2. *Rapid health assessment protocols for emergencies*. Geneva, World Health Organization, 1999 ([http://www.wpro.who.int/vietnam/publications/rapid\\_health\\_assessment\\_protocols.pdf](http://www.wpro.who.int/vietnam/publications/rapid_health_assessment_protocols.pdf), accessed 18 August 2015).
3. Tokuda K et al. A survey conducted immediately after the 2011 Great East Japan Earthquake: evaluation of infectious risks associated with sanitary conditions in evacuation centers. *Journal of Infection and Chemotherapy*, 2014, 20:498–501. doi:10.1016/j.jiac.2014.04.012 pmid:24861538
4. Ranghieri F, Ishiwatari M, editors. *Learning from megadisaster: lessons from the Great East Japan Earthquake*. Washington, DC, The World Bank, 2014 (<https://openknowledge.worldbank.org/handle/10986/18864>, accessed 18 August 2015).
5. *The Great East Japan Earthquake: a story of a devastating natural disaster, a tale of human compassion*. Manila, World Health Organization Regional Office for the Western Pacific, 2012 ([http://www.wpro.who.int/publications/docs/japan\\_earthquake.pdf](http://www.wpro.who.int/publications/docs/japan_earthquake.pdf), accessed 18 August 2015).
6. *Humanitarian charter and minimum standards in disaster response*. Geneva, The Sphere Project, 2011 (<http://www.sphereproject.org/>, accessed 18 August 2015).
7. Brennan RJ, Rimba K. Rapid health assessment in Aceh Jaya District, Indonesia, following the December 26 tsunami. *Emergency Medicine Australasia*, 2005, 17:341–350. doi:10.1111/j.1742-6723.2005.00755.x pmid:16091096

# Management of the dead in Tacloban City after Typhoon Haiyan

Julius Erving Ballera,<sup>ab</sup> Vikki Carr de los Reyes,<sup>b</sup> Ma Nemia Sucaldito,<sup>b</sup> Alethea De Guzman,<sup>ab</sup> Luis Sy Jr,<sup>b</sup> Ma Justina Zapanta,<sup>b</sup> Ferchito Avelino,<sup>b</sup> Joselito Feliciano<sup>b</sup> and Enrique Tayag<sup>b</sup>

Correspondence to Julius Erving Ballera (email: jerving30@gmail.com).

**Introduction:** The post-disaster management of the dead involves a series of steps including on-site identification, transfer, storage and examination of bodies and delivery to families for burial. Two weeks after Typhoon Haiyan, a team from the Department of Health (DOH) was tasked with identifying the dead in Tacloban City.

**Methods:** A suitable site for the collection of bodies was identified and an algorithm and standard data collection form developed. The retrieval of bodies was coordinated with the Bureau of Fire Protection personnel. Upon receipt of a body, two team members conducted a systematic external examination. Findings were documented, photos were taken and each body was assigned a unique number.

**Results:** The DOH team examined 128 bodies. Of these, the majority (86%) were complete bodies; 95% were decomposed and two were skeletonized. Two thirds (66%) were adults, sex was identifiable for 92%, and the male to female ratio was 1:1.4. The majority of adults were females. Only 11% were presumptively identified from documents in clothing; 89% remained unidentified.

**Conclusion:** From the limited setting of this study, we describe the process of rapid body processing post-Haiyan. We prioritized rapid processing over more technically complicated means of identification, including DNA testing. Our protocol showed a dignified and efficient way of identifying corpses. As local and regional laboratory capacity increases in the Philippines, the collection of DNA specimens may become part of the identification algorithm.

The management of the dead after a disaster involves a series of activities that begin with the search for bodies, on-site identification of the body, transfer of the body to the facility serving as the morgue, delivery of the body to family members and assistance from the state for final disposal of the body.<sup>1</sup> Management of the dead is one of the most difficult aspects of disaster response, as natural disasters, in particular, can cause a large number of deaths.<sup>2</sup>

Typhoon Haiyan was estimated by the National Disaster Risk Reduction and Management Council to have caused 6300 fatalities across the country.<sup>3</sup> The Bureau of Fire Protection in Tacloban City was in charge of retrieving dead bodies which were originally placed in trenches in the public cemetery. There was no further system for managing these bodies. Although not a public health risk, the collection and disposal of bodies in this manner presented a psychologically traumatic experience for the affected population.<sup>4</sup>

Therefore, a team from the Department of Health (DOH) was formed to assist with the

management of bodies in Tacloban City post-Haiyan on 19 and 20 November 2013. This included the development of a body identification algorithm and data collection forms. This paper describes this experience.

## METHODS

Upon arrival in Tacloban City, the DOH team assessed the public cemetery where the dead bodies had been placed. An alternate collection centre was identified, assessed and cleared by a sanitary engineer.

The DOH team developed an algorithm for managing the dead bodies based on the World Health Organization and DOH guidelines (**Figure 1**).<sup>1,5</sup> A standard data collection form was also developed that included fields for physical description (body composition, decomposition status, sex and probable age) and evidence collected from the bodies.

The team coordinated with the Philippine National Police for security. City officials met with the community to prepare them for the transfer of bodies from the

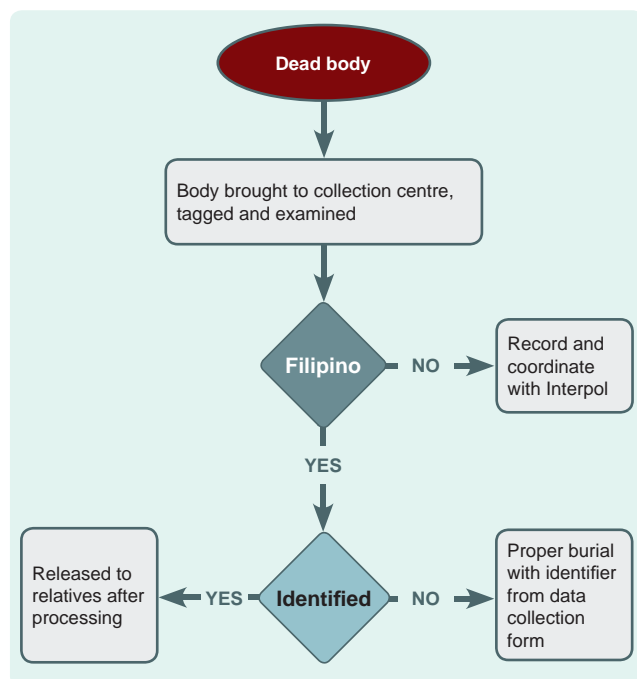
<sup>a</sup> Field Epidemiology Training Program, Epidemiology Bureau, Department of Health, Sta Cruz, Manila, Philippines.

<sup>b</sup> Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 30 April 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_004

Figure 1. Department of Health's algorithm for the management of dead bodies after Typhoon Haiyan, the Philippines, 2013<sup>1,5</sup>



cemetery to the collection centre. At the collection centre the following tasks were conducted:

## 1. Processing the dead bodies

An area in the collection centre was identified to receive and place unexamined bodies along with any information obtained from the body. Upon receipt, each body was numbered, and pre-numbered tags were attached to the body and the body bag. Each body was then assigned to examiners and given a data collection form that was pre-numbered to match the body tag.

An area in the collection centre was designated for examination. The bodies were transferred from the receiving area to the examination area where at least two examiners were assigned per body to conduct a systematic examination. Findings were documented using the data collection form. An examiner also took photos of the body, clothing, accessories and other personal items. Each image included the body's unique number.

After examination, completed forms were collected and bodies were either released to the family or transferred to a holding area before burial.

## 2. Burial

The bodies without identification were buried in trenches proximal to the collection centre. Each trench was at least 1.5 metres deep, and the bodies were buried single file in the trenches. Wooden sticks with the relevant unique identification numbers marked the placement of bodies. A map of the buried bodies was created.

## 3. Data storage, analysis and dissemination

The data from the forms were entered on to a database and frequencies were calculated using Epi Info version 3.5.4.

## RESULTS

From 20 to 21 November 2013, 256 bodies were received at the collection centre. Of these, 50% were processed by the DOH team; the remainder were processed by the National Bureau of Investigation. There was no common protocol for data collection on the bodies and no shared database.

Most of the 128 bodies examined by the DOH team were complete bodies (110, 86%); 95% were decomposed and two were skeletonized. Sex was identifiable for 118 bodies (92%) with a male to female ratio of 1:1.36. According to visual recognition of forensic experts, two thirds (66%) were adults, 8% were adolescents, 20% were children and 5% were infants. The majority of the adult bodies identified were females (male to female ratio of 1:1.5). The non-adult sex ratio was 1:1 (Table 1).

Only 14 (11%) of the bodies were identified through personal belongings contained inside the body bag; one other was identified by family members. Therefore, 89% remained unidentified and were buried accordingly. During the two days the team was present, none of these bodies were identified from the photographs of the deceased or their clothing.

## DISCUSSION

The management of the dead was a major challenge in the aftermath of Typhoon Haiyan due to limited access to the affected areas. No identification was made for 89% of the bodies processed by the DOH team in Tacloban

**Table 1. Profile of bodies received at collection centre in Tacloban City, the Philippines, 20–21 November 2013 (n = 128)**

Data	N	%
<b>A. General body condition</b>		
Complete	110	86.0
Incomplete	9	7.0
Body part	1	0.8
No data	8	6.0
<b>B. State of decomposition</b>		
Preserved	0	0.0
Decomposed	121	95.0
Skeletonized	2	2.0
No data	5	4.0
<b>C. Sex</b>		
Male	50	39.0
Female	68	53.0
Probably male	1	0.8
Probably female	4	3.0
Undetermined	1	0.8
No data	4	3.0
<b>D. Probable age group</b>		
Infant	6	5.0
Child	26	20.0
Adolescent	10	8.0
Adult	83	65.0
No data	3	2.0
<b>E. With names identified</b>		
	14	11.0

City on 20 and 21 November 2013. Although visual recognition of cadavers is prone to errors,<sup>2</sup> it is the simplest form of identification. It has been recommended that visual recognition should be complemented with other means of forensic identification, even if this occurs at a later stage.<sup>2</sup> In this post-disaster setting, we prioritized rapid body processing over more technical means of identification such as DNA testing. We were also unable to determine if any bodies were identified from photos after we left.

In our study more female bodies were processed, consistent with a higher proportion of deaths reported from another study completed post-Haiyan.<sup>6</sup> This finding is also consistent with data on deaths from a post-tsunami study from Aceh, Indonesia.<sup>7</sup> The total number of deaths from Typhoon Haiyan was estimated at 6300;

however, this has not been disaggregated by age or sex<sup>3</sup> so whether our results are representative is unknown. Generalizations about why females died are not always helpful in understanding complex and diverse processes. On the contrary, generalizations may create an image of females as vulnerable victims.<sup>7</sup>

For identification of the dead to be effective, a list of people missing and believed to be dead along with an organized collection of ante mortem data about those people would be useful. In the Philippines, a DNA database of citizens is not routinely done pre-disaster which limits the use of DNA references in identifying bodies after disasters.

A consequence of multiple agencies being involved in the management of the dead after Typhoon Haiyan was lack of a common database or identification algorithm. A well-coordinated system of managing dead bodies is an important factor in determining the post-disaster recovery speed of an affected community.<sup>8</sup> The plan for the management of dead bodies is not exclusive to the health sector and requires previous planning and coordination with civil, governmental, military and police authorities at national and regional levels.<sup>9</sup> This planning should be part of disaster preparedness.

The post-disaster management of the dead needs to be an efficient process, and a single protocol for identification and data collection should be established for use in future disasters in the Philippines. As local and regional laboratory capacity increases, collection of DNA specimens may be added to the identification algorithm, especially in disasters with a smaller number of deaths.

### *Conflicts of interest*

None declared.

### *Funding*

None.

### *Acknowledgements*

We are grateful for the cooperation and support of DOH – Regional Office 8, the local government unit

of Tacloban City, Dr Andres Patino of the International Committee of the Red Cross, Dr Raquel Fortun from the University of the Philippines and Dr Stephen Cordner.

## References

1. *Management of dead bodies in disaster situations: Disasters manuals and guidelines series, No 5*. Washington, DC, Pan America Health Organization, 2004 ([http://www.who.int/hac/techguidance/management\\_of\\_dead\\_bodies.pdf](http://www.who.int/hac/techguidance/management_of_dead_bodies.pdf), accessed 14 August 2015).
2. Morgan OP, Tidball-Binz M, van Alphen D, editors. *Management of dead bodies after disasters: a field manual for first responders*. Washington, DC, Pan America Health Organization, 2009 (<https://www.icrc.org/eng/assets/files/other/icrc-002-0880.pdf>, accessed 14 August 2015).
3. *NDRRMC updates re the effect on Typhoon Yolanda (Haiyan), 17 April 2014*. Manila, Natural Disaster Risk Reduction and Management Council, 2014 (<https://web.archive.org/web/20141006091212/http://www.ndrrmc.gov.ph/attachments/article/1177/Update%20Effects%20TY%20YOLANDA%2017%20April%202014.pdf>, accessed 14 August 2015).
4. *Public health risk assessment and interventions, Typhoon Haiyan, Philippines 2<sup>nd</sup> Edition – 16 December 2013*. Manila, World Health Organization Regional Office in the Western Pacific, 2013 ([http://www.wpro.who.int/philippines/typhoon\\_haiyan/media/philippines\\_typhoon\\_haiyan\\_ph\\_risk\\_assessment\\_december2013.pdf](http://www.wpro.who.int/philippines/typhoon_haiyan/media/philippines_typhoon_haiyan_ph_risk_assessment_december2013.pdf), accessed 14 August 2015).
5. *Administrative Order No. 2007-0018: National policy on the management of the dead and the missing persons during emergencies and disasters (4 July 2007)*. Manila, Department of Health, 2007 ([http://hems.doh.gov.ph/uploads/policy\\_attachments/eb8c3af8ca141639f6b74c22712c5e97c8827736.pdf](http://hems.doh.gov.ph/uploads/policy_attachments/eb8c3af8ca141639f6b74c22712c5e97c8827736.pdf), accessed 14 August 2015).
6. Ching PK et al. An assessment of disaster-related mortality post-Haiyan in Tacloban City. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):34–38. doi:10.5365/wpsar.2015.6.2.HYN\_005
7. *The tsunami's impact on women, Oxfam briefing note*. London, Oxfam International, 2005 (<http://policy-practice.oxfam.org.uk/publications/the-tsunamis-impact-on-women-115038>, accessed 14 August 2015).
8. Perera C, Briggs C. *Management of dead in mass disasters – a review of South Asian perspectives*. Kandalama, 2011 Annual International Conference – International Conference on Building Resilience, 2011 (<http://www.iiir.ualgary.ca/files/iiir/233.pdf>, accessed 14 August 2015).
9. *Risk of dead bodies associated with an epidemic*. Washington, DC, Pan America Health Organization, 2011 ([http://www.paho.org/disasters/index.php?option=com\\_content&view=article&id=971%3Arisk-of-dead-bodies-associated-with-an-epidemic&catid=1052%3Amanagement-of-dead-bodies&Itemid=931&lang=en](http://www.paho.org/disasters/index.php?option=com_content&view=article&id=971%3Arisk-of-dead-bodies-associated-with-an-epidemic&catid=1052%3Amanagement-of-dead-bodies&Itemid=931&lang=en), accessed 14 August 2015).



# An assessment of drinking-water quality post-Haiyan

Bonifacio Magtibay,<sup>a</sup> Maria Sonabel Anarna<sup>b</sup> and Arturo Fernando<sup>a</sup>

Correspondence to Bonifacio Magtibay (email: magtibaybo@wpro.who.int).

**Introduction:** Access to safe drinking-water is one of the most important public health concerns in an emergency setting. This descriptive study reports on an assessment of water quality in drinking-water supply systems in areas affected by Typhoon Haiyan immediately following and 10 months after the typhoon.

**Methods:** Water quality testing and risk assessments of the drinking-water systems were conducted three weeks and 10 months post-Haiyan. Portable test kits were used to determine the presence of *Escherichia coli* and the level of residual chlorine in water samples. The level of risk was fed back to the water operators for their action.

**Results:** Of the 121 water samples collected three weeks post-Haiyan, 44% were contaminated, while 65% (244/373) of samples were found positive for *E. coli* 10 months post-Haiyan. For the three components of drinking-water systems – source, storage and distribution – the proportions of contaminated systems were 70%, 67% and 57%, respectively, 10 months after Haiyan.

**Discussion:** Vulnerability to faecal contamination was attributed to weak water safety programmes in the drinking-water supply systems. Poor water quality can be prevented or reduced by developing and implementing a water safety plan for the systems. This, in turn, will help prevent waterborne disease outbreaks caused by contaminated water post-disaster.

Access to safe drinking-water is one of the most important public health concerns in an emergency setting. The greatest waterborne risk to health is the transmission of faecal pathogens.<sup>1</sup> *Escherichia coli*, a thermotolerant bacterium, is widely used as an index of faecal contamination in drinking-water.<sup>2</sup> This bacterium is abundant in human and animal faeces and is found in natural water and soil contaminated by faecal matters. Both the World Health Organization (WHO) guidelines and the Philippine National Standards for Drinking-Water use *E. coli* as the main indicator of microbiological contamination of drinking-water.<sup>1,3</sup> Many important pathogens could be present if *E. coli* is detected, such as *Vibrio cholerae*, *Salmonella (typhi)*, pathogenic strains of *E. coli*, *Giardia*, *Cryptosporidium* and various viruses.

After Typhoon Haiyan, Region 8 experienced severe damage and destruction,<sup>4</sup> including damage to water supply infrastructures. Three weeks after Haiyan, the Philippine Department of Health (DOH), together with WHO, organized two National Water Quality Monitoring Teams to undertake a rapid assessment of drinking-water quality in priority areas. After this, DOH and WHO organized training, provided portable test

kits and developed a monitoring system to strengthen the capacity of local government units (LGUs) and to establish a system capable of managing and monitoring water quality at the LGU level – a situation that did not exist before Typhoon Haiyan.

This paper presents the findings from these two water quality surveys three weeks and 10 months after Typhoon Haiyan.

## METHODS

Three weeks after Typhoon Haiyan, two National Water Quality Monitoring teams composed of water experts from DOH, Local Water Utilities Administration, Maynilad Water Services Incorporated, Manila Water Co. and WHO conducted rapid assessments in Region 8. Water testing was conducted over 11 days in November and December 2013 on two separate field trips in Leyte province and Eastern Samar provinces and Ormoc and Tacloban cities. The first field visit included Eastern Samar and some municipalities of Leyte and villages of Tacloban City. The second was for Ormoc City, additional municipalities in Leyte and villages of Tacloban City.

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 5 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_011

Portable test kits were used to determine the presence of *E. coli* in water samples. The portable test kit used hydrolysable chromogenic substrates for the detection of enzymes of coliform bacteria employing the presence-absence, single 100 mL sample format based on *Standard Methods for Water and Wastewater*.<sup>5</sup> Samples were collected from drinking-water sources, storage and distribution lines using DOH's prescribed standard procedures. Within the maximum holding time of six hours after collection, the water samples were placed in portable incubators for 18 hours maintained at 35 °C. *E. coli* presence was confirmed if fluorescence was observed in the discoloured water samples after exposure to ultraviolet lamps.

The level of residual chlorine was also measured using a digital colorimeter which provided results in less than five minutes. The Philippine National Standards for Drinking-water requires that residual chlorine be in a range of 0.30–1.5 ppm to be effective in inactivating pathogens.<sup>3</sup> This parameter indicates the level of protection of the water system from bacterial contamination. A hand-held Global Positioning System device recorded the geographic coordinates of the sampling points.

The same portable test kits were provided by WHO and DOH to LGUs eight months after Haiyan. These were used to train LGU teams on water testing, sanitary surveys, water treatment and water safety planning.<sup>4</sup> During this training, the LGU water quality monitoring teams conducted testing of various types of drinking-water systems (i.e. point sources, communal faucets and individual household piped connections).

Water testing was again conducted in the provinces of Leyte and Eastern Samar and the cities of Ormoc and Tacloban in September and December 2014, 10 months post-Haiyan by the recently trained LGU teams. The LGU teams prioritized sampling areas using these criteria: (1) a large population affected by Typhoon Haiyan; (2) those who remained most vulnerable to flooding; and (3) where drinking-water systems served large populations. The sampling points identified in the water testing by the LGU were not necessarily the same sampling points tested by the National Water Quality Monitoring Teams in November and December 2013. The level of residual chlorine was also tested.

Together with water quality testing, the LGU conducted risk assessments of the drinking-water systems using the sanitary inspection forms adopted from WHO (1997).<sup>6</sup> The forms included a checklist of water supply system components from source to distribution, incorporating all potential points where hazards may be introduced. A risk score was given for every observed and perceived hazard in the system with the total risk score determining the level of risk of the water supply system. Remedial actions for the risks were provided in the form, and feedback was given to the operators of the water supply systems to address the risks.

The results of the water testing and risk assessment were recorded on the monitoring forms, entered into Excel spreadsheets and transmitted to DOH for consolidation and further analysis. Testing results were mapped using the Google Maps Engine software. We consolidated and analysed the data gathered by the LGU and presented these together with the findings of the rapid assessment.

## RESULTS

The rapid assessment found nearly half of the water samples collected were positive for *E. coli* (53/121, 44%). Leyte province had the highest proportion of positive samples (38/72, 53%) and Ormoc City had the lowest (1/16, 6%) (Table 1). The rapid assessment also found that three quarters of the water samples (90/121, 74%) did not comply with the minimum residual chlorine level of 0.3 mg/L. The province of Eastern Samar registered the highest proportion of non-complying residual chlorine level (19/20, 95%) and Ormoc City the lowest (10/16, 63%) (Table 1).

Ten months after Haiyan, two thirds of the samples collected in Eastern Visayas were positive for *E. coli* (244/373, 65%). Eastern Samar province had the highest proportion of contaminated samples (134/170, 79%) while Ormoc City remained the lowest (22/62, 36%) (Table 1). The same survey revealed 93% of 311 water samples had residual chlorine below the minimum required level. Leyte and Eastern Samar provinces showed the highest proportions of water samples not complying with the minimum chlorine requirement at 98% (89/91) and 95% (161/170), respectively (Table 1).

Table 1. Presence of *E. coli* and chlorine levels in drinking-water system components in Region 8, the Philippines, November–December 2013 and September–December 2014

Local government units	Component	Positive for <i>E. coli</i> n (%)		Non-compliant chlorine levels* n (%)	
		Nov–Dec 2013	Sept–Dec 2014	Nov–Dec 2013	Sept–Dec 2014
Leyte	Water source	15/21 (71)	42/53 (79)	20/21 (95)	52/53 (98)
	Storage	5/8 (62)	2/3 (67)	6/8 (75)	3/3 (100)
	Distribution	18/43 (42)	21/35 (60)	26/43 (60)	34/35 (97)
<b>Subtotal</b>		<b>38/72 (53)</b>	<b>65/91 (71)</b>	<b>52/72 (72)</b>	<b>89/91 (98)</b>
Eastern Samar	Water source	5/11 (45)	75/87 (86)	11/11 (100)	87/87 (100)
	Storage	–	21/27 (78)	–	25/27 (93)
	Distribution	4/9 (44)	38/56 (68)	8/9 (89)	49/56 (87)
<b>Subtotal</b>		<b>9/20 (45)</b>	<b>134/170 (79)</b>	<b>19/20 (95)</b>	<b>161/170 (95)</b>
Tacloban City	Water source	5/7 (71)	21/31 (68)	7/7 (100)	31/31 (100)
	Storage	–	0/2 (0)	–	1/2 (50)
	Distribution	0/6 (0)	2/17 (12)	2/6 (33)	6/17 (35)
<b>Subtotal</b>		<b>5/13 (38)</b>	<b>23/50 (46)</b>	<b>9/13 (69)</b>	<b>38/50 (76)</b>
Ormoc City	Water source	0/5 (0)	6/36 (17)	5/5 (100)	–
	Storage	1/1 (100)	8/14 (57)	1/1 (100)	–
	Distribution	0/10 (0)	8/12 (67)	4/10 (40)	–
<b>Subtotal</b>		<b>1/16 (6)</b>	<b>22/62 (35)</b>	<b>10/16 (63)</b>	–
Total	Water source	25/44 (57)	144/207 (70)	43/44 (98)	170/171 (99)
	Storage	6/9 (67)	31/46 (67)	7/9 (78)	29/32 (91)
	Distribution	22/68 (32)	69/120 (57)	40/68 (59)	89/108 (82)
<b>Grand total</b>		<b>53/121 (44)</b>	<b>244/373 (65)</b>	<b>90/121 (74)</b>	<b>288/311 (93)</b>

\* Based on the Philippine National Standards for Drinking-water where residual chlorine should be in a range of 0.30–1.5 ppm.<sup>3</sup>

“–”, no samples taken.

The rapid assessment found faecal contamination, as indicated by the presence of *E. coli*, affected 57%, 67% and 32% of source, storage and distribution components, respectively. Ten months after Haiyan *E. coli* presence was still high across all water supply system components (70% source, 67% storage and 57% distribution) (Table 1).

The risk assessments identified the following risk factors: (1) damage to the water supply systems sustained in Typhoon Haiyan; (2) poor engineering design; (3) lack of protection against environmental hazards; (4) inadequate preventive maintenance; and (5) the presence of pollution from human activities (e.g. septic tanks, garbage disposal, open defecation) within a 25 m radius of water sampling points.

## DISCUSSION

The overall water quality in both the rapid assessment conducted three weeks after Haiyan and the LGU monitoring 10 months after Haiyan was poor (44% and 65%, respectively). This was especially true for the specimens collected in Eastern Samar province almost a year after Haiyan, with more than three quarters faecally contaminated. Nearly half a million people living in the

province of Eastern Samar would have been vulnerable to this contaminated water. Chlorination could have mitigated the risks to public health posed by faecal contamination in drinking-water, but as both surveys showed, non-compliance to the minimum required residual chlorine was very high: 74% in the rapid assessment three weeks after the typhoon and 93% for the LGU monitoring 10 months post-Haiyan. The poor water quality may be attributed to the damage Haiyan caused to sanitation facilities. The extensive destruction scattered human waste and infected wastewater which might have reached drinking-water sources. Lack of chlorination may be due to low budget allocation by the LGU or destruction of chlorinators by Haiyan.

Our results highlight that the problem with the water supply was widespread and long-term. More than half of all samples, collected from different components of the supply system, were contaminated, suggesting that faecal contamination was entering all parts of the system.

As historical water quality data was not available, we cannot assume that the unrepaired damage from Typhoon Haiyan was solely responsible for the poor water quality, but it was likely a significant contributing factor. Other

risks that were identified included lack of engineering design to protect the system from environmental hazards, inadequate preventive maintenance and human interference too close to the water source. These risks may have existed before Haiyan, and they increased the contamination vulnerability of the weak system.

In other post-disaster studies, similar findings were noted. In 2011, following a flood in Thailand, a study evaluated the microbiological quality of tap water and found 92% of the samples had a total bacterial load that exceeded the Thai water quality standards.<sup>7</sup> Another study found water samples in Banda Aceh two years after the tsunami were more contaminated when compared to reference points before the tsunami.<sup>8</sup> Substandard drinking-water was found four weeks after a cyclone affecting a remote Pacific island.<sup>9</sup> Three weeks after Haiyan, 105 cases of gastroenteritis were identified in Leyte, and the cause of the outbreak was associated with contaminated water.<sup>10</sup>

Contaminated water is commonly the source of large outbreaks of diseases such as cholera, dysentery, typhoid fever and acute diarrhoea.<sup>1,11</sup> This can be prevented by the application of a comprehensive risk assessment and risk management programmes implemented across all components of the systems from source to distribution.

Water safety plans are a risk management tool considered by WHO to be the most effective way of consistently ensuring the safety of drinking-water. Plans should include control measures for all identified risk factors.<sup>1</sup> At the household level, the use of chemical or solar disinfection, filtration, boiling, sedimentation or a combination of these methods is recommended as an immediate intervention to deliver safe water post-disaster.

## CONCLUSION

This study demonstrated that drinking-water supply systems were contaminated by pathogens as indicated by the presence of *E. coli* immediately and 10 months after Haiyan. Millions of people had potentially been consuming faecally contaminated water for almost a year following Typhoon Haiyan, increasing the risk of illness to an already vulnerable population. We recommend each LGU develop and implement a water safety plan to mitigate the risk of waterborne diseases both during

non-emergency times and post-disaster. While LGU teams should continue their water quality monitoring and risk assessment activities as part of a water safety programme, action to rectify problems (such as fixing broken pipes or chlorination) should be undertaken to improve protection of water supply systems from contamination.

## Conflicts of interest

None declared.

## Funding

None.

## Acknowledgements

We would like to thank the national water quality monitoring teams from DOH, Local Water Utilities Administration, WHO, Maynilad and Manila Water, as well as the provincial and city water quality monitoring teams for their support in the data gathering activities.

## References

1. *Guidelines for drinking-water quality, Fourth edition*. Geneva, World Health Organization, 2011 ([http://apps.who.int/iris/bitstream/10665/44584/1/9789241548151\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/44584/1/9789241548151_eng.pdf), accessed 12 August 2015).
2. Payment P, Waite M, Dufour A. Chapter 2: Introducing parameters for the assessment of drinking-water quality. In: World Health Organization and the Organization for Economic Co-operation and Development (editors). *Assessing microbial safety of drinking-water: improving approaches and methods*. London, IWA Publishing, 2003, pp. 47–78 ([http://www.who.int/water\\_sanitation\\_health/dwq/9241546301full.pdf](http://www.who.int/water_sanitation_health/dwq/9241546301full.pdf), accessed 12 August 2015).
3. *Administrative Order No: 2007-0012: Philippine National Standards for Drinking-Water* (9 March 2007). Manila, Department of Health, 2007 ([http://www.lwua.gov.ph/downloads\\_14/Philippine%20National%20Standards%20for%20Drinking%20Water%202007.pdf](http://www.lwua.gov.ph/downloads_14/Philippine%20National%20Standards%20for%20Drinking%20Water%202007.pdf), accessed 12 August 2015).
4. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.2.HYN\_026
5. Method 9223: Chromogenic substrate coliform test (proposed). In: Franson MAH (editor). *Standard methods for the examination of water and wastewater, 18th edition*. Washington, DC, American Public Health Association, 1992: pp.63–64 (<https://law.resource.org/pub/us/cfr/ibr/002/apha.method.9223.1992.pdf>, accessed 12 August 2015).
6. *Guidelines for drinking-water quality, 2nd edition – Volume 3: Surveillance and control of community supplies*. Geneva, World Health Organization, 1997 ([http://www.who.int/water\\_sanitation\\_health/dwq/gdwq2v1/en/index2.html](http://www.who.int/water_sanitation_health/dwq/gdwq2v1/en/index2.html), accessed 12 August 2015).

7. Chaturongkasumrit Y et al. Microbiological evaluation of water during the 2011 flood crisis in Thailand. *The Science of the Total Environment*, 2013, 463:959–967. doi:10.1016/j.scitotenv.2013.06.071 pmid:23872186
8. Suhendrayatna M, Munawar E, Zaki M. Water quality assessment in the tsunami-affected areas of Banda Aceh. *Jurnal Rekayasa Kimia dan Lingkungan*, 2009, 7(1):1–4 (<http://jurnal.unsyiah.ac.id/RKL/article/view/59/54>, accessed 12 August 2015).
9. Mosley LM, Sharp DS, Singh S. Effects of a tropical cyclone on the drinking-water quality of a remote Pacific island. *Disasters*, 2004, 28:405–417. doi:10.1111/j.0361-3666.2004.00266.x pmid:15569381
10. Ventura RJ et al. A community-based gastroenteritis outbreak after Typhoon Haiyan, Leyte, Philippines, 2013. *Western Pacific Surveillance and Response Journal*, 2015, 6:1–6. doi:10.5365/wpsar.2014.5.1.010 pmid:25960917
11. Wisner B, Adams J. *Environmental health in emergencies and disasters: a practical guide*. Geneva, World Health Organization, 2002 ([http://www.who.int/water\\_sanitation\\_health/hygiene/emergencies/em2002intro.pdf](http://www.who.int/water_sanitation_health/hygiene/emergencies/em2002intro.pdf), accessed 12 August 2015).



# Responding to the health and rehabilitation needs of people with disabilities post-Haiyan

Mylene Rose Benigno,<sup>a</sup> Pauline Kleinitz,<sup>b</sup> Liezel Calina,<sup>c</sup> Ma Rowena Alcido,<sup>a</sup> Bérengère Gohy<sup>d</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Mylene Rose Benigno (email: benignom@wpro.who.int or myles\_md@yahoo.com).

**Introduction:** It is estimated that 15% of the world's population has a disability, and disasters increase their risk and vulnerability. Rehabilitation services were limited in the area of the Philippines that was affected by Typhoon Haiyan. This study describes the initial rehabilitation needs assessment and activities to increase rehabilitation services conducted in Leyte province of Region 8 after Haiyan.

**Method:** A rehabilitation needs assessment for people with disabilities and injuries needing physical and functional rehabilitation care and assistive devices was conducted in health facilities, evacuation centres and selected municipalities in Leyte province between 9 November 2013 and 30 April 2014 by a consortium of agencies. Improvements to service delivery and referrals were documented.

**Results:** Rehabilitation services were reduced immediately after Haiyan, but they increased in the following months and peaked four months after Haiyan. There were 2998 individuals needing medicine and rehabilitation management, functional care and assistive devices. These included persons with pre-existing disabilities whose situations had worsened and people who had sustained injuries in the typhoon. Additional improvements included rehabilitation services with provision of assistive devices at the regional hospital, development of a directory of disability services in the region and advocacy through community-based rehabilitation.

**Discussion:** Information services and community knowledge for people with disabilities improved in Region 8 after Typhoon Haiyan, demonstrating that strengthening rehabilitation systems is a realistic goal after disasters.

More than a billion people, or about 15% of the world's population, are estimated to live with some form of disability.<sup>1</sup> Disability, as defined by the *International Classification of Functioning, Disability and Health*, refers to an impairment, activity limitation or participation restriction that is the result of the interaction between health conditions and environmental and personal factors. It relates to the body functions and structures of people, the activities people do, the life areas in which they participate and the environmental factors that affect these experiences.<sup>2</sup>

Disasters impact people with disabilities disproportionately; in settings where resources are limited, like the Philippines, the impact of disasters on these people can be long-term and far-reaching.<sup>3</sup> Disasters affect people with existing disabilities and create a new generation of people with disabilities, most

of whom will need rehabilitation services. People with disabilities are at an increased risk in emergency and disaster situations.<sup>4</sup> They may experience increased vulnerability due to limited access to information, healthcare and rehabilitation and loss of support networks, especially if family and caregivers are killed or injured in the disaster.<sup>5</sup> During the disaster, they may have more difficulty evacuating; following the disaster, they may have difficulty physically accessing essential service (latrines, water, etc.). Losing an assistive device in a disaster, such as an artificial limb, hearing aide or spectacles, also increases vulnerability.

In the Philippines, rehabilitation services are limited, particularly in the public (government-funded) health sector, and are mainly found in major cities in Level 3 hospitals.<sup>6</sup> Most specialists, particularly physiatrists, practice in the National Capital Region

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> World Health Organization Regional Office for the Western Pacific, Manila, Philippines.

<sup>c</sup> Department of Rehabilitation Medicine, Eastern Visayas Regional Medical Center, Tacloban City, Leyte, Philippines.

<sup>d</sup> Handicap International, Avenue des Frères Lumières, Lyon, France.

Submitted: 5 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_010

(Manila).<sup>7</sup> Rehabilitation, as defined for the scope of this paper, is a set of measures that assist individuals with disabilities, both pre-existing and new, to achieve and maintain optimal body function in interaction with their environment.<sup>1</sup>

Nationwide in 2011, there were 305 729 low-income households with members having disabilities. Region 8, the area most affected by Typhoon Haiyan, had 13 478 low-income households in which people with disabilities lived.<sup>8</sup> Following Typhoon Haiyan in November 2013, all six hospitals in Tacloban City, the capital of Leyte province, that previously offered rehabilitation services were devastated. The entire physical therapy unit of the Eastern Visayas Regional Medical Center (regional hospital) was flooded, most of the therapeutic equipment was destroyed and medical records were water damaged. Shops that sold assistive devices (standard orthopaedic wheelchairs, crutches, walkers and canes) were also damaged. Like the rest of the people of Tacloban City, hospital and health personnel were also victims of the disaster. Immediately after Haiyan, all services, including rehabilitation services for people with disabilities and injuries ceased at both in- and out-patient facilities. Some limited services resumed a few weeks after the disaster with the help of local and international volunteers and the establishment of temporary facilities such as field hospitals.

In this paper we describe the needs assessments and the activities conducted to increase access to rehabilitation and other services for people with disabilities and with injuries. The assessments were conducted by the World Health Organization (WHO), Handicap International (HI), Department of Health (DOH) and rehabilitation medicine specialists in Leyte province during the acute response up to April 2014, five months post-Haiyan.

## INITIAL REHABILITATION NEEDS ASSESSMENT AND ACUTE RESPONSE

A rehabilitation needs assessment for people with disabilities and injuries needing physical and functional rehabilitation care and assistive devices was conducted in health facilities (four hospitals and

four temporary field hospitals), evacuation centres and selected municipalities (Alang-Alang, Babatngon, Palo, Pastrana, Sta Fe, Tacloban City, Tanauan and Tolosa) in Leyte province, Region 8 between 9 November 2013 and 30 April 2014 by HI through a grant agreement with WHO using the individual rehabilitation assessment form (**Figure 1**) and by rehabilitation specialists of tertiary hospitals in Tacloban City. People with injuries and disabilities were assessed according to their physical, sensorial and cognitive difficulties and functional limitations in performing activities of daily living such as eating, drinking, dressing, bathing, toileting, moving, communicating and playing with children.

There were 2998 individuals identified as needing physical medicine and rehabilitation management, functional care and assistive devices, including persons with pre-existing disabilities and people who had sustained injuries in the typhoon. There was a consistent increase in the number of cases identified from November 2013 until the peak during March 2014 when a total of 889 patients were seen reflecting peak in referrals and availability of services (**Figure 2**).

More people were identified in health facilities compared to in the community (2232 versus 766, respectively) due to limited human resources and accessibility to the community (evacuation areas and houses). All needed rehabilitation services were delivered, including independence training in daily activities, proper transfer and transition techniques, therapeutic exercises, and gait and mobility training on how to use the assistive mobility devices.

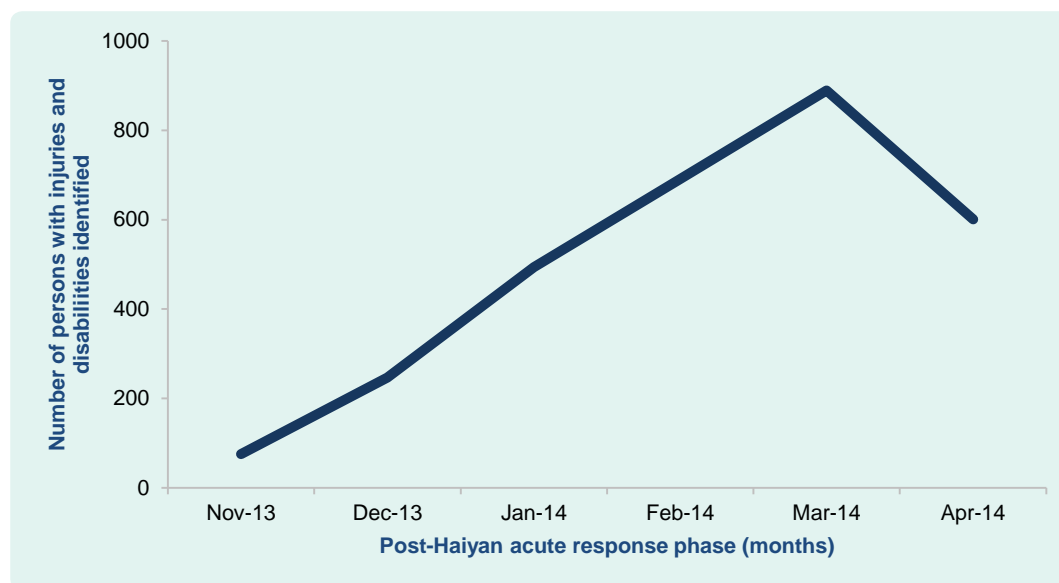
Almost 400 devices, including 50 prostheses and 320 mobility devices (133 canes, 98 crutches, 50 walking frames and 39 wheelchairs), were provided to people with new injuries or pre-existing disabilities.

Many people with disabilities were evacuated to Manila, however, the exact number is unknown. Based on hospital records gathered from the major hospitals in Manila and Cebu with comprehensive rehabilitation medicine services, forty people needing critical care and rehabilitation management were transferred from Region 8.

Figure 1. Individual rehabilitation assessment form used for post-Haiyan needs assessment in Region 8, the Philippines, 2014

[illegible]

Figure 2. **Number of people with injuries and disabilities identified and accessing rehabilitation services in Leyte province by month, Region 8, the Philippines, 9 November 2013 to 30 April 2014**



## IMPROVING DELIVERY OF REHABILITATION SERVICES IN THE REGIONAL HOSPITAL

Prior to Typhoon Haiyan, there were few rehabilitation services in Leyte province and they were commonly led by rehabilitation medicine specialists. Of the 79 hospitals in Region 8, rehabilitation services were only provided in nine (11% of hospitals); two were government hospitals offering services at reduced costs (2.5% of hospitals). One of these was the Eastern Visayas Regional Medical Center (EMVRCM) in Tacloban City, a regional hospital which offered primarily home-based exercise programmes as physical therapy services.

Following Haiyan, strengthening these services was a priority for hospital management and the DOH. In April 2014, five months post-Haiyan, EVRMC established a Department of Rehabilitation Medicine that increased the coverage of rehabilitation services to include not only physical therapy but also psychiatric consultations, occupational therapy sessions and provision of prostheses and orthoses. A workshop to manufacture for prostheses and orthoses was established to cater to the demand from the rehabilitation medicine team (physiatrist, physical therapists and occupational therapist), and it became the first provider of prostheses (e.g. artificial legs) and orthoses (e.g. leg braces) in Region 8. Psychiatry and social services were

also provided in the hospital as an integral part of rehabilitation.

The WHO Representative Office in the Philippines contributed to improving rehabilitation medicine by procuring rehabilitation equipment (e.g. therapeutic ultrasound, resistive exercise products and fine motor and dexterity activity sets).

As a result of these improvements, the regional hospital provided rehabilitation to more patients, including those in critical care units, for a wider range of musculoskeletal and neurological conditions. The number of patients receiving rehabilitation in the regional hospital grew from 533 patients per year before Haiyan to 1547 in 2014.

## STRENGTHENING DISABILITY REFERRAL SYSTEM

### Directory of services

A *Directory of Health, Rehabilitation and Disability Services* for Region 8 was published in November 2014.<sup>9</sup> This directory served as a guide for all personnel advocating, treating and caring for people with disabilities in the health and social welfare sectors as it provided information on available services, including health professionals and facilities, sources of assistive

devices, schools and therapy centres, support groups, disabled persons organizations and professional groups. With all this information in one directory, people with disabilities had better access to information on various services and programmes.

Most of the key stakeholders in the disability sector (18/25, 72%) attended the launch of the directory. It was also distributed to government offices, nongovernmental organizations and their constituents in all six provinces of Region 8.

### Community-based rehabilitation initiative

Community-based rehabilitation (CBR) is a programmatic approach to increase awareness and inclusion of people with disabilities at the community level and was implemented by the local government with support from WHO. The post-Haiyan CBR initiative was developed through orientation lectures, situational analysis, resource mapping, development of a plan of action and formation of a CBR working group. Tacloban City was chosen as the model city for CBR, in line with the Presidential Order, and the mayor designated an officer and provided an office space.

At the regional and provincial level, there was participation by most key stakeholders (21/25, 84%) in CBR orientation and training conducted by WHO from 20 to 21 November 2014. Attendees included officers from the departments of Persons with Disability Affairs Office (PDAO), Welfare and Social Development, Health, Education, Public Works and Highway, Interior and Local Government, Transportation and Communications, Budget and Management as well as other components of the Regional Committee on Disability Affairs, professional groups and disabled persons organizations (DPO).

At the city level, CBR orientation and workshops were conducted in Tacloban City by WHO from 23 to 24 October 2014; these were well attended by 88% (22/25) of key stakeholders. These included local government representatives, city officials from social welfare and development, budget, health, hospitals, special education, planning, Public Employment Service Office, professional groups (doctors, teachers), DPOs (Autism Society, Parent group, PWD cooperative), nongovernmental organizations and advisers from the

National Council for Disability Affairs (NCDA). A PDAO-CBR Technical Committee was formed in Tacloban City comprised of 18 members of key stakeholders, line agencies and advocates. The group worked on budget proposals and plans of actions for the city's priority disability programmes.

At the community level, CBR training and orientation was conducted at all 138 villages in Tacloban City by WHO from 13 to 19 March 2015. Information on CBR was disseminated widely through the barangay captains, health workers, day care workers and volunteers. As a result, the issues faced by people with disabilities are more widely known. During the sessions, disability issues (awareness, sensitization, data consolidation, education, livelihood, employment, organization, participation, health services, social welfare) were included in the barangay development plan and budget. The PDAO-CBR Technical Committee will continue to guide and strengthen the Tacloban City CBR program.

### Other initiatives

In March 2015, DOH conducted a two-day training course on disability-inclusive health and rehabilitation services at the primary health care level. Approximately 50 non-specialist doctors and nurses participated from selected cities and municipalities of Region 8. The training presented the various laws regarding people with disabilities, the range of services needed, and the specific people, agencies and facilities in Region 8 that can address disability needs.

At the national level, the NCDA produced and disseminated two advocacy documents promoting consultation and inclusion of people with disabilities in rebuilding efforts.

Several other tools were collaboratively developed to promote disability awareness at the community level in Region 8. The most widely reproduced was a poster advocating actions for information, empowerment and respect for people with disabilities. The posters were distributed to all 510 government offices and nongovernmental organization in Region 8 and promoted positive behavioural changes in the community.



## DISCUSSION

Rehabilitation services for people with disabilities are necessary and can be effective after a disaster. Although rehabilitation services at the regional hospital in Leyte province declined immediately after Haiyan, they increased in the months following to a peak of people accessing these services four months after Haiyan. This increase in patients can be attributed to the improvement in services at the regional hospital as well as increased awareness of the referral system.

Haiyan provided an opportunity to “build back better” in terms of infrastructure and service development, particularly at the regional hospital, which was significantly damaged. Expansion of services in the region helped decentralize specialized disability services that were previously only available in Manila and Cebu.

The fact that services, information and community knowledge for people with disabilities improved in Region 8 after the initial needs assessment post-Haiyan shows the importance of conducting such assessments after a disaster to critically address the specific needs of people with disabilities. In a relatively short period of time, i.e. five months, sustainable improvements in health service delivery resulted in more than double the number of people with disabilities being seen for a wider range of conditions.

There were several approaches adopted which helped to ensure people with disabilities were accepted as contributing members of the community. One approach was disability-inclusive development and inclusion in recovery and rebuilding efforts; another was through the CBR initiative that resulted in the community having a better understanding of the needs of people with disabilities. An ideal CBR programme reduces the effects of poverty, promotes human rights and ensures dignity for all persons with disabilities and their family members.<sup>10</sup>

Some limitations to this work were that resources did not allow support to all areas of Leyte, rather it focused on selected municipalities. There were also other actors for disability that contributed to the response effort who were not part of this paper. It is likely that some underestimation of the number of people with disabilities and injuries occurred and other activities may not have been documented.

This study also found that detailed pre-disaster data were limited and that having estimations and profiles of people with disabilities in communities before a disaster would improve the response. Efforts to increase referral for the Philippines PWD Identification Card is currently being conducted through active identification through the PDAO office and through CBR referral efforts from the barangay health workers of Tacloban City;<sup>11</sup> this would be one way to identify people with disabilities post-disaster. The needs assessment that was conducted has been the only assessment done in Region 8. Accurate situational assessments of needs and available services accelerated relief and recovery efforts and mitigated some of the consequences of Haiyan for this vulnerable population.

Developing rehabilitation services in all hospitals in the Philippines will improve the quality of life and decrease the burden of disease. Of significant concern is that only 11% (9 out of 79) of hospitals in Region 8 offered rehabilitation services. Advocating for wider implementation of Republic Act No. 10070, an *Act to Establishing Institutional Mechanism to Ensure the Implementation of Program and Services for Persons with Disability in every Province, City and Municipality*,<sup>11</sup> will improve conditions for people with disabilities, not only after disasters, but all the time.

## CONCLUSIONS

The number of people with disabilities and injuries increases after a disaster. Determining those who will need specific disability and rehabilitation services, as well as mapping these services, are vital responses following a disaster. Inclusion of people with disabilities in initial health assessments should become routine after disasters. Without information about the situation and the services, the conditions of people with disabilities and injuries will worsen over time.

Working with health, rehabilitation and disability sectors is essential for improving access to services for people with disabilities. Improving the coordination and planning between these stakeholders, for example through development and utilization of the regional service directory and CBR programme development, increased access to services. This study demonstrated that improving services and increasing coordination between services, beyond pre-disaster levels, was a realistic goal.

## Conflicts of interest

None declared.

## Funding

None.

## Acknowledgements

We thank the Eastern Visayas Regional Medical Center, Divine Word Hospital and Remedios T Romualdez Hospital for their involvement in this work. We also acknowledge HI for conducting the initial needs assessment and providing the data.

## References

1. World Health Organization and The World Bank. *World Report on Disability*. Geneva, World Health Organization, 2011 ([http://www.who.int/disabilities/world\\_report/2011/report.pdf](http://www.who.int/disabilities/world_report/2011/report.pdf), accessed 11 August 2015).
2. *International classification of functioning, disability and health (ICF)*. Geneva, World Health Organization, 2001 (<http://www.who.int/classification/icf/en/>, accessed 11 August 2015).
3. *Disasters, disability and rehabilitation*. Geneva, World Health Organization Department of Injuries and Violence Prevention, 2005 ([http://www.who.int/violence\\_injury\\_prevention/other\\_injury/disaster\\_disability2.pdf](http://www.who.int/violence_injury_prevention/other_injury/disaster_disability2.pdf), accessed 11 August 2015).
4. *World Disaster Report 2007 – Focus on discrimination*. Geneva, International Federation of Red Cross and Red Crescent Societies, 2007 (<http://www.ifrc.org/PageFiles/99876/2007/WDR2007-English.pdf>, accessed 11 August 2015).
5. *Disaster risk management for health fact sheet: People with disabilities and older people*. Geneva, World Health Organization, 2011 ([http://www.who.int/hac/events/drm\\_fact\\_sheet\\_disabilities.pdf](http://www.who.int/hac/events/drm_fact_sheet_disabilities.pdf), accessed 10 August 2015).
6. *National Objectives for Health: 2011–2016*. Manila, Department of Health, 2011 (<http://www.rchsd.ph/images/Downloads/national%20objectives%20for%20health%202011-2016.pdf>, accessed 11 August 2015).
7. Martinez R. *Current Developments in the Philippines rehabilitation services*. Manila, 1<sup>st</sup> Public Health Convention on the Health and Wellness of Persons with Disabilities: increasing access to health and wellness, 6 November 2014 (<http://www.doh.gov.ph/sites/default/files/CurrentDevelopmentsPhilippineRehabilitationServices.pptx>, accessed 24 August 2015).
8. *National Household Targeting System for Poverty Reduction (NHTS-PR)*. Manila, Department of Social Welfare and Development, 2011 ([http://listahanan.dswd.gov.ph/download/reports/profile\\_of\\_the\\_poor\\_/profile%20of%20the%20poor-021213.pdf](http://listahanan.dswd.gov.ph/download/reports/profile_of_the_poor_/profile%20of%20the%20poor-021213.pdf), accessed 24 August 2015).
9. *Directory of health, rehabilitation and disability services: Region 8*. Manila, World Health Organization Regional Office for the Western Pacific, 2014 ([http://www.wpro.who.int/philippines/publications/directory\\_disability/en/](http://www.wpro.who.int/philippines/publications/directory_disability/en/), accessed 11 August 2015).
10. World Health Organization, United Nations Educational, Scientific and Cultural Organization, International Labour Organization, International Disability and Development Consortium. *Community-based rehabilitation: CBR guidelines*. Geneva, World Health Organization, 2010 (<http://www.who.int/disabilities/cbr/guidelines/en/>, accessed 11 August 2015).
11. *Ordinance No. 2014–12–15: an ordinance creating persons with disability affairs office (PDAO) of Tacloban City*. Tacloban City, Tanggapan ng Sangguniang Panlungsod, June 2014.

# The prevention and control of dengue after Typhoon Haiyan

Charito Aumentado,<sup>a</sup> Boyd Roderick Cerro,<sup>b</sup> Leonido Olobia,<sup>b</sup> Lyndon Lee Suy,<sup>c</sup> Aldrin Reyes,<sup>c</sup> Pahalagedera HD Kusumawathie,<sup>a</sup> Maria Sagrado,<sup>a</sup> Julie Lyn Hall,<sup>a</sup> Rabindra Abeyasinghe,<sup>d</sup> Alice Ruth Foxwell<sup>ae</sup> and Lasse S Vestergaard<sup>ad</sup>

Correspondence to Lasse S Vestergaard (email: lasse.vestergaard@dadlnet.dk).

**Objective:** Many of the areas in the Philippines affected by Typhoon Haiyan are endemic for dengue; therefore, dengue prevention was a priority in the initial post-disaster risk assessment. We describe the dengue prevention and response strategies applied after Haiyan.

**Methods:** The dengue response was implemented by a wide range of national and international stakeholders. Priorities included the rapid re-establishment of an effective surveillance system to quickly identify new dengue cases, monitor trends and determine the geographical distribution of cases. Dengue rapid diagnostic tests (RDTs) were distributed to sentinel health facilities, and comprehensive vector control activities and entomological surveys were implemented. Several training sessions for key stakeholders and awareness campaigns for communities were organized.

**Results:** There were RDT-positive dengue cases reported from urban and semi-urban areas where entomological surveys also confirmed a high density of *Aedes aegypti* mosquitoes. Although there was an increase in dengue cases in January 2014, the number of cases remained below the epidemic threshold throughout the remaining months of 2014.

**Discussion:** There was no large outbreak of dengue after Haiyan, possibly due to the targeted, multifaceted and rapid response for dengue after Haiyan. However, surveillance differed after Typhoon Haiyan, making comparisons with previous years difficult. Multiple players contributed to the response that was also facilitated by close communication and coordination within the Health Cluster.

Dengue is endemic in the Philippines, with the number of notified cases ranging from less than 20 000 in 2005<sup>1</sup> to 204 906 in 2013<sup>2</sup> and 113 485 in 2014.<sup>3</sup> Although these case numbers reported from health facilities through the national surveillance systems are high, the actual case burden has been estimated to be seven times higher.<sup>4</sup> Dengue epidemics occur at three- to four-year intervals, with the most recent epidemic experienced in 2010.<sup>1</sup> Fortunately, while the notification rate of dengue cases has increased in the Philippines in recent years, the case fatality rate has declined<sup>1</sup> following the introduction of new national clinical dengue case management guidelines. These are based on the latest global guidelines issued by the World Health Organization (WHO)<sup>5</sup> and have been implemented through comprehensive training of doctors and nurses nationwide. While dengue transmission occurs year-round, a sharp increase is usually observed between

July and October, the main rainy season, when there is increased mosquito breeding. There is also a smaller peak observed around January.<sup>6</sup> Dengue prevention efforts and public health campaigns are permanently implemented at various levels by national, regional and provincial health authorities, but are intensified before these dengue peak seasons, particularly in established high-risk areas.

Dengue outbreaks are common after natural disasters such as earthquakes, typhoons and floods.<sup>7</sup> Typhoon Haiyan, which hit the Philippines on 8 November 2013, rapidly destroyed or damaged houses, health facilities and infrastructure on a devastating scale.<sup>8</sup> Sustained rainfall in subsequent weeks resulted in the excessive accumulation of debris with stagnant water. Both provided the potential for a large increase in mosquito breeding sites, leading to an expanding

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Regional Office for Eastern Visayas, Department of Health, Tacloban City, Philippines.

<sup>c</sup> Department of Health, Sta Cruz, Manila, Philippines.

<sup>d</sup> Division of Communicable Diseases, World Health Organization Regional Office for the Western Pacific, Manila, Philippines.

<sup>e</sup> National Centre for Epidemiology and Public Health, Australia National University, Canberra, Australia.

Submitted: 30 July 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.3.HYN\_018

mosquito population and a higher risk of dengue transmission. The dengue-endemic areas of Region 8, with its six provinces and a population of around 4 million people,<sup>9</sup> was severely affected by the typhoon.

Given the potential for a large dengue outbreak following Haiyan, the *WHO public health risk assessment for Typhoon Haiyan* recognized dengue fever as one of the health priorities for the affected areas with a potential increase in cases occurring in the six weeks post-typhoon.<sup>10</sup> The aim of the response to dengue was to prevent an outbreak in the immediate aftermath of the typhoon and to reinstate dengue control, surveillance and response capacity ahead of the usual peak season that would follow in the year after the typhoon. This paper describes the dengue prevention and response strategies applied after Haiyan in Region 8.

## METHODS

### Surveillance

Notifiable diseases are reported weekly to the Philippine Integrated Disease Surveillance and Response System (PIDSR);<sup>11</sup> frequency was increased to daily reporting for dengue and seven other priority diseases 10 days after Haiyan from eight hospitals/mobile clinics within and near Tacloban City. The standard case definitions for dengue cases with warning signs and probable dengue cases were used.<sup>6</sup> However, post-Haiyan probable dengue cases also included those cases who had a positive rapid antigen-antibody test.

Additional health personnel from the Department of Health (DOH), foreign medical teams and response consultants worked in surveillance reporting and case investigations. Alerts for dengue – clustering of cases or a death of a suspect dengue case – were also reported through event-based surveillance (ESR). In the Philippines, an outbreak is considered when the number of reported dengue cases exceeds the epidemic threshold, i.e. the average number of cases reported in the previous five years.

Surveillance in Post Extreme Emergencies and Disaster (SPEED)<sup>12</sup> was also activated three weeks after Haiyan at selected sites such as evacuation centres and rural health units. Reports of acute haemorrhagic fever (AHF) cases were monitored as these can be dengue

cases, with any cases or deaths reported immediately referred to the Regional Surveillance and Epidemiology Unit (RESU) for further verification and investigation. SPEED runners with motorbikes were hired to facilitate data collection and submission to the provincial level for analysis to be reported to the regional and national level.

Updated maps of dengue cases were produced by the RESU and shared among dengue programme coordinators and with health partners at Health Cluster meetings.

### Diagnosis and clinical management of dengue cases

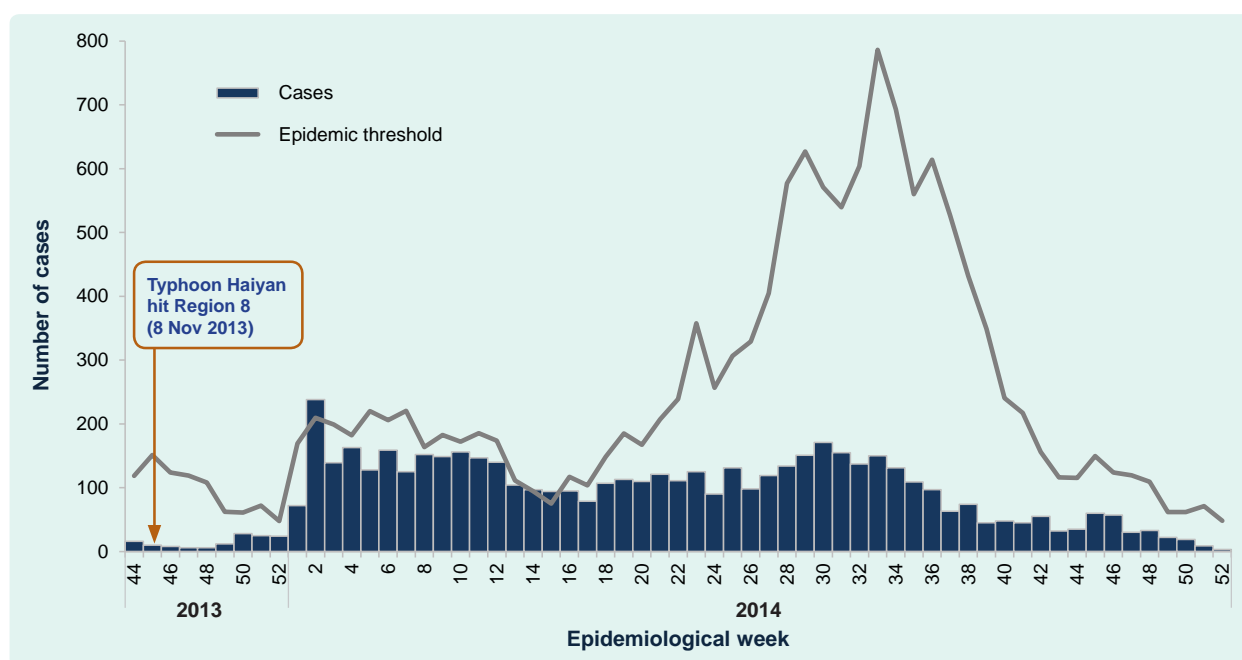
Four weeks after the typhoon, commercial antigen-antibody combination dengue rapid diagnostic tests (RDTs) were strategically distributed to eight selected hospitals/health centres in Region 8. The purpose was to determine the proportion of RDT-positive dengue cases (i.e. probable dengue cases) among all reported suspected cases and to establish the presence of dengue in an area. Primarily index cases were tested, and RDT-positive cases were reported to RESU for mapping to guide rapid response measures and targeted interventions. RDT results were not confirmed by serology and virus isolation.

Treatment of cases followed the standard clinical criteria. Clinical guidelines on dengue case management were provided to hospitals and health centres together with refresher training of health staff from all typhoon-affected areas by DOH, local health authorities and international partners.

### Vector control activities

Vector control operations, which involved fogging (space spraying), larvaciding (primarily applying the chemical pyriproxifen) and search-and-destroy activities were initiated 12 days after Haiyan. Areas located around hospitals, damaged schools, evacuation centres and other public places were systematically targeted. Later, when case-based surveillance had been re-established, vector control operations were conducted based on reported dengue cases. As the local vector control capacity was disrupted, vector control activities were supported by staff from other regions and by foreign medical teams and

Figure 1. Weekly number of dengue cases reported to PIDSR in Region 8, the Philippines, 2013–2014 ( $n = 5264$ )



\* Epidemic threshold is the average annual number of cases reported in the previous five years.

PIDSR, Philippine Integrated Disease Surveillance and Response.

military. Additional fogging equipment and insecticides were provided, following national standard requirements and specifications.

## Mosquito surveys

A series of entomological assessments were conducted by WHO and regional health authorities in Tacloban City, Ormoc City and in some selected municipalities three months after the typhoon to identify the main dengue vector breeding sites, assess the vector density after the typhoon and evaluate the effect of vector control interventions. The Breteau index was determined in each locality following standard procedures.<sup>13</sup> Sanitation inspectors and community-based village dengue brigades were trained on vector surveillance and integrated vector control. DOH also promoted search-and-destroy activities with the support of the village dengue brigades. Entomological data collection was repeated following vector control cycles to monitor reductions in mosquito numbers.

## RESULTS

### Dengue cases

There were 164 dengue cases with warning signs reported in Region 8 through PIDSR between 8 November and

31 December 2013. For 2014, there were 5227 dengue cases reported with 20 deaths (case fatality rate [CFR] = 0.4%), a 61% increase in cases compared to 2013 ( $n = 3254$ ). Ages of cases ranged from 29 days to 88 years (median: 13 years old). The number of cases exceeded the epidemic threshold in January 2014 but not again during 2014 (Figure 1).

Among the 5227 dengue cases in 2014, 1490 (29%) were tested with RDTs and 1172 were positive (79%). There was a clustering of RDT-positive cases in urban and semi-urban settings (Figure 2) where the most debris accumulated due to the typhoon.

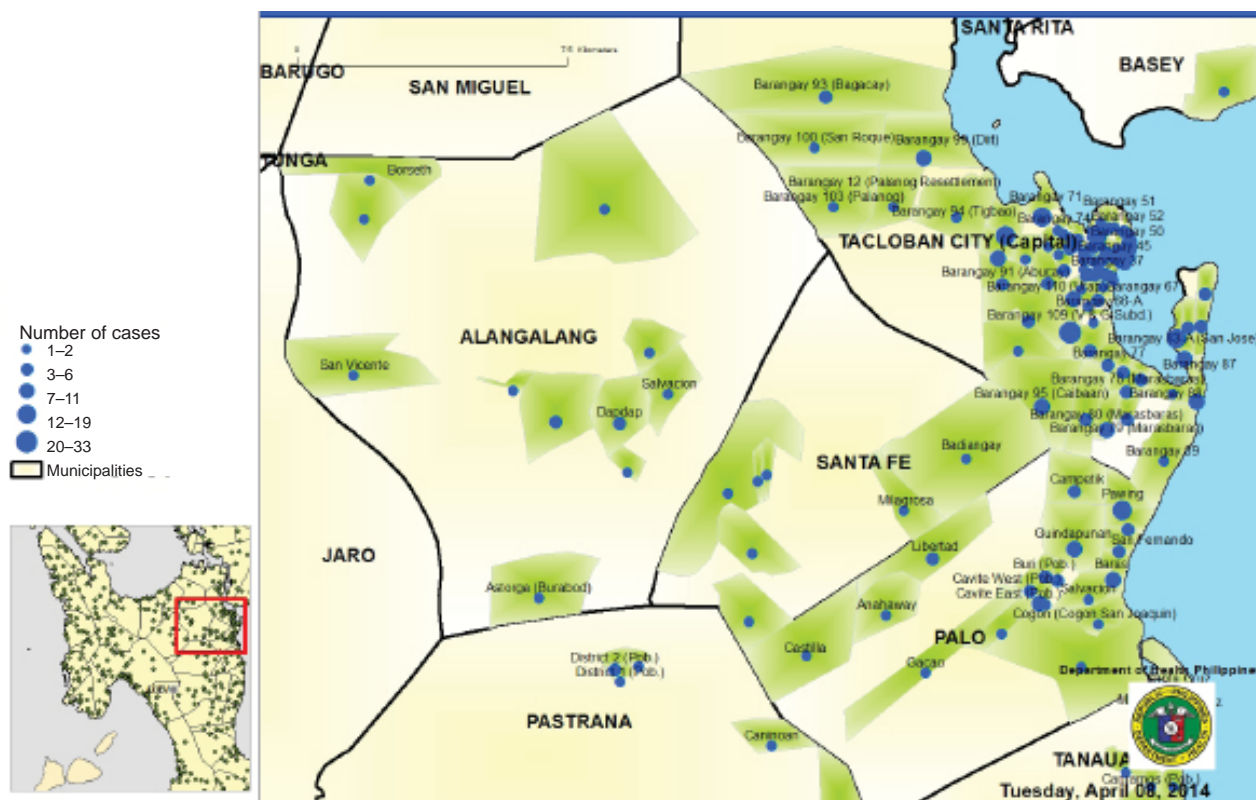
There were 31 cases of AHF reported through SPEED from Leyte province who were hospitalized between 11 and 25 November 2013. Four cases of suspected dengue were reported through ESR in Leyte province from 1 to 7 December 2013.

### Vector control activities

There were two to three cycles of integrated vector control operations and vector surveillance data collection administered at one- to two-week intervals in the 14 targeted villages in Tacloban City. Local health offices had limited capacity for vector control due to reduced human resources and logistical support. Community



Figure 2. Geographical distribution of dengue cases by village, Tacloban City, the Philippines, January to March 2014



participation in assessing household activities to eliminate breeding sites was low.

### Mosquito surveys

Entomological surveys were undertaken three months post-Haiyan and comprised at least 100 households in each locality, except one locality where only 85 households were included (average: 302; median: 159; range: 85–973). Overall, the surveys found a high density of *Aedes aegypti* mosquitoes in all surveyed institutions and areas. In Ormoc City, only *Aedes aegypti* was detected, while in Tacloban City, both *Aedes aegypti* and *Aedes albopictus* were detected. The Breteau index decreased between the first and second cycles in many villages (Figure 3) as did the House index and Pupal index (data not shown). The Breteau index decrease was most marked in Village 71 of Tacloban City where after a three-week interval it decreased from 52 to 6; the House index also decreased from 20% to 5%, as did the Pupal index from 233% to 56% over three vector control cycles.

The most common containers with mosquito breeding observed were discarded containers (50%),

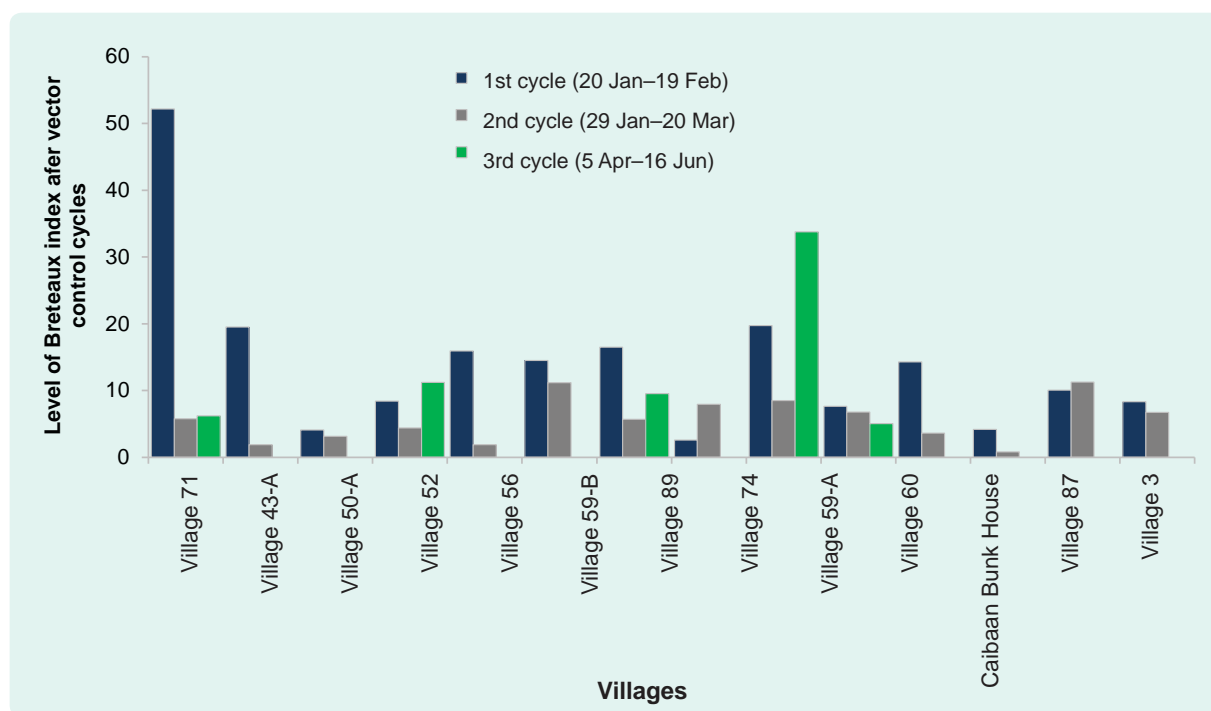
tyres (18%), home utensils (11%), water storage tanks (6%), flower pots (5%), rainwater harvesting drums (3%), removed roof covers (3%) and others (4%).

### Awareness campaigns and trainings

WHO and DOH conducted workshops on dengue clinical case management, vector surveillance, vector control, social mobilization and the case surveillance system. There were 128 health staff from different provinces and municipalities trained on clinical case management and a total of 199 participants in trainings overall (from 14 hospitals, eight local health units and 71 villages).

A series of advocacy activities were conducted by DOH and partner organizations: distribution of information, communication and education materials; broadcasting of radio messages and radio guest speakers; and other health promotion activities. Awareness was also heightened among foreign aid workers following a small cluster of dengue cases among them.<sup>9</sup> Long-lasting insecticide-treated nets were distributed to selected government hospitals to prevent transmission to patients and staff.





## DISCUSSION

A multifaceted response was rapidly initiated for the prevalence and control of dengue post-Haiyan from many stakeholders, including national and regional health authorities and local and international agencies. Although the number of dengue cases reported in Region 8 in 2014 was higher than in 2013, there were no outbreaks reported and the epidemic threshold was only exceeded in January 2014. This observed increase may partly be due to the initial efforts for dengue surveillance, increased attention and awareness and the use of RDTs at sentinel health facilities. As RDT-positive cases were included in the probable case definition after Haiyan, caution is required when making comparisons with previous years.

Reducing dengue transmission was one of the initial priorities of the response to Haiyan,<sup>10</sup> and this was achieved through strengthening dengue surveillance for early detection and through targeted vector control. Moving to daily reporting of dengue cases through PIDSR and SPEED allowed for earlier identification of cases with the directed targeted vector control efforts. This timeliness limited the potential spread. Using maps of cases also assisted in targeting vector control in real time.

The use of RDTs also contributed to early diagnosis and targeted vector control as they increased the specificity of diagnosis. In non-emergency times, an increase of clinically suspicious dengue cases usually occurs during the peak season from July to October so that cases presenting with flu-like symptoms are diagnosed with dengue without any laboratory confirmation. Ideally, RDT-positive cases should have been confirmed with further laboratory tests, at least for a subset of samples, but this was not feasible given the circumstances. Despite this, the use of RDTs in selected health facilities helped improve the diagnostic accuracy of dengue and allowed for suspected outbreaks of dengue to be confirmed as not being dengue, especially in the early response.

The early vector control activities that occurred post-Haiyan comprised of space spraying and chemical larviciding, and these were initially conducted sporadically across affected areas without any entomological evidence base. Although wide-scale spraying is not advocated for the prevention of dengue except in outbreak situations,<sup>13</sup> this initial spraying did appear effective in reducing mosquito densities particularly in evacuation centres and hospitals. However, further evidence is required to determine the efficacy of such control strategies.<sup>14</sup> Larviciding of mosquito breeding sites and around debris

and garbage collection areas also reduced mosquito and fly densities, which was important due to the continuous rainfall in the months following Haiyan that increased mosquito breeding sites. The continued rain also encouraged more indoor time that can lead to increased exposure to indoor *Aedes aegypti* species.

There are several limitations in this assessment, most of which relate to it being conducted in a post-disaster situation. There was not sufficient entomological data to draw firm conclusions about the effect of vector control interventions, and the exact size of the population denominator in specific geographical locations was unknown. Therefore it was difficult to determine the extent to which the emergency response reduced and prevented transmission of dengue. Changes to the case definition also prevents detailed comparisons with previous years. However, based on the limited data available, and the fact that the epidemic threshold was only exceeded in January 2014, it appears that the response to dengue was effective. This was achieved despite many operational challenges and adverse conditions for the dengue prevention efforts. Close collaboration among the local community, DOH, WHO and numerous national and international organizations ensured that dengue cases were detected early and targeted responses were quickly implemented, thus successfully minimizing widespread cases of dengue in Region 8. The lessons learnt and the increased local capacity built in Region 8 as part of the response to dengue after Typhoon Haiyan will likely benefit both in emergency and non-emergency responses in the future.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

The authors sincerely acknowledge the contributions of every individual and institution involved in the response to dengue and all other health problems caused by Typhoon Haiyan in the Philippines.

### References

1. Bravo L et al. Epidemiology of dengue disease in the Philippines (2000–2011): a systematic literature review. *PLoS Neglected Tropical Diseases*, 2014, 8:e3027. doi:10.1371/journal.pntd.0003027 pmid:25375119
2. *Philippine integrated disease surveillance and response annual report, 2013*. Manila, Public Health Surveillance Division National Epidemiology Center Department of Health, 2014 (<https://xa.yimg.com/kq/groups/85999055/777284928/name/pidsr2013.pdf>, accessed 5 October 2015).
3. *Disease surveillance report: morbidity week 52 – December 2014*. Manila, National Epidemiology Center, Public Health Surveillance and Informatics Division, Department of Health, 2014 (unpublished).
4. Edillo FE et al. Economic cost and burden of dengue in the Philippines. *American Journal of Tropical Medicine and Hygiene*, 2015, 92:360–366. doi:10.4269/ajtmh.14-0139 pmid:25510723
5. *Dengue: guidelines for diagnosis, treatment, prevention and control*. Geneva, World Health Organization, 2009 ([http://apps.who.int/iris/bitstream/10665/44188/1/9789241547871\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/44188/1/9789241547871_eng.pdf), accessed 30 September 2015).
6. Arima Y, Chiew M, Matsui T. Epidemiological update on the dengue situation in the Western Pacific Region, 2012. *Western Pacific Surveillance and Response Journal*, 2015, 6(2):82–89. doi:10.5365/wpsar.2014.5.4.002 pmid:26306221
7. Watson JT, Gayer M, Connolly MA. Epidemics after natural disasters. *Emerging Infectious Diseases*, 2007, 13:1–5. doi:10.3201/eid1301.060779 pmid:17370508
8. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
9. *CountrySTAT Philippines*. Manila, Philippine Statistics Authority, 2015 (<http://countrystat.psa.gov.ph/>, accessed 23 September 2015).
10. *Public health risk assessment and interventions: Typhoon Haiyan, Philippines – 16 November 2013*. Geneva, World Health Organization, 2013 ([http://who.int/hac/crises/phl/sitreps/philippines\\_ph\\_risk\\_assessment\\_16November2013.pdf](http://who.int/hac/crises/phl/sitreps/philippines_ph_risk_assessment_16November2013.pdf), accessed 23 September 2015).
11. Gallardo FDL et al. An assessment of the case notification system 16 months after Typhoon Haiyan in Region 8, the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):71–75. doi:10.5365/wpsar.2015.6.2.HYN\_002
12. Tante S et al. Which surveillance systems were operational after Typhoon Haiyan? *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):66–70. doi:10.5365/wpsar.2015.6.2.HYN\_015
13. *Western Pacific Education in Action Series No. 8: Guidelines for dengue surveillance and mosquito control*. Manila, World Health Organization Regional Office for the Western Pacific, 1995 ([http://iris.wpro.who.int/bitstream/10665.1/5474/3/9290611383\\_eng.pdf](http://iris.wpro.who.int/bitstream/10665.1/5474/3/9290611383_eng.pdf), accessed 23 September 2015).
14. Esu E et al. Effectiveness of peridomestic space spraying with insecticide on dengue transmission; systematic review. *Tropical Medicine & International Health*, 2010, 15:619–631. pmid:20214764

# Which surveillance systems were operational after Typhoon Haiyan?

Sheila Tante,<sup>a</sup> Eireen Villa,<sup>a</sup> Agnes Pachon,<sup>a</sup> Maria Adona Galvan<sup>a</sup> and Aura Corpuz<sup>b</sup>

Correspondence to Sheila Tante (email: [epidoc\\_sheila@yahoo.com](mailto:epidoc_sheila@yahoo.com)).

**Introduction:** Effective disease surveillance is vital for a successful disaster response. This study assessed the functionality of the three disease surveillance systems used post-Haiyan: Philippine Integrated Disease Surveillance and Response (PIDSR), Event-based Surveillance and Response (ESR) and Surveillance in Post Extreme Emergencies and Disasters (SPEED).

**Methods:** A survey of 45 government health officers from affected areas was conducted in March 2014. The survey documented when each of the systems was operational and included questions that ranked the functionality of the three surveillance systems and whether they complemented each other.

**Results:** Two of 11 (18%) surveillance units had an operational SPEED system pre-event. PIDSR and ESR remained operational in five of 11 (45%) surveillance units without interruption of reporting. Ten surveillance units (91%) rated PIDSR as functional post-Typhoon; eight (72.7%) considered ESR functional. SPEED was rated as functional by three (27%) surveillance units. Seven of 11 (63.6%) surveillance units rated the three systems as being complementary to each other.

**Discussion:** In most of the areas affected by Typhoon Haiyan, the routine surveillance systems (PIDSR and ESR) were not disrupted; although, in Leyte it took seven weeks for these to be operational. Although SPEED is recommended for activation within 48 hours after a disaster, this did not occur in most of the surveyed areas. Most of the surveillance units rated PIDSR, ESR and SPEED to be complementary to each other.

Disease surveillance is an integral part of health emergency and disaster management as it allows for the early detection of epidemic-prone diseases for timely and appropriate response, prevention and minimizing morbidity and mortality.<sup>1</sup>

In the Philippines, the Department of Health (DOH) redesigned the existing disease surveillance mechanisms into the Philippine Integrated Disease Surveillance and Response (PIDSR) system in 2008.<sup>2</sup> PIDSR is a case-based surveillance system for the routine reporting of 11 identified diseases on a daily basis (Category 1) with another 14 reported weekly (Category 2).<sup>3</sup> The Event-based Surveillance and Response (ESR) system was established in 2010 to complement PIDSR and includes the reporting of events not captured by other systems. ESR can capture rare, unusual or unexpected events with formal reporting through a reporting system, media, health workers or nongovernmental organizations

(NGOs); or informally through rumours, phone calls or text messages.<sup>2</sup>

In 2010, the DOH-Health Emergency Management Bureau, with assistance from the World Health Organization (WHO), introduced Surveillance in Post Extreme Emergencies and Disasters (SPEED). This electronic-based surveillance mechanism was specifically designed for use during an emergency or disaster. It captures data on 21 communicable and noncommunicable syndromes with case definitions that are different from the regular surveillance systems.<sup>4</sup> Data are collected by SPEED coordinators and surveillance officers from health units and sentinel sites specific to the disaster and are reported daily using a structured reporting mechanism. SPEED was activated in Region 6 in October 2013 when the provinces of Cebu City and Bohol were hit by an earthquake. As SPEED includes syndromes of certain conditions, the reporting should be

<sup>a</sup> Field Epidemiology Training Program Alumni Foundation Incorporated, Department of Health Compound, Sta Cruz, Manila, Philippines.

<sup>b</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

Submitted: 18 June 2015; Published: 6 November 2015

doi: [10.5365/wpsar.2015.6.2.HYN\\_015](https://doi.org/10.5365/wpsar.2015.6.2.HYN_015)

faster than the routine schemes. Once SPEED has been activated, it continues to operate until conditions return to routine levels.

After Typhoon Haiyan hit the Philippines on 8 November 2013, these three surveillance systems were compromised as several health facilities were destroyed and most key health personnel were victims. This study aimed to determine which of the three disease surveillance systems were operational, as well as their functionality and whether they complemented each other for the six months post-Haiyan.

## METHODS

In March 2014, we conducted a survey of 45 government health officers who represented cities, municipalities and provinces from Regions 6, 7 and 8 – the areas worst hit by Haiyan. DOH regional and central counterparts at the local level also participated in the survey; almost half (49%) were Health Emergency Management Coordinators, SPEED coordinators and PIDSR-ESR surveillance officers. The survey assessed the three disease surveillance systems for the period each was operational, their functionality and whether they complemented each other.

We asked the participants to assess functionality in the context of the following attributes: (a) the simplicity of the system while being able to meet its objectives; (b) its flexibility to accommodate (e.g. new events); (c) the completeness and validity of the data recorded; (d) sensitivity to detect outbreaks and monitor changes; and (e) timeliness between steps in a public health surveillance system.<sup>5</sup> For Leyte and Tacloban City, functionality was assessed over two time periods which corresponded to when PIDSR and ESR were not operational (November to December 2013) and when they were operational (January 2014 onwards). Functionality was ranked using a Likert Scale of 1 to 5 where 1–2 was not functional, 3 neutral and 4–5 functional. We also asked the participants to consider whether the three systems complemented each other post-Haiyan. Responses were also measured using a Likert Scale of 1 to 5 where 1–2 was not complementary, 3 neutral and 4–5 complementary.

## RESULTS

The operation of the three disease surveillance systems varied post-Haiyan by region and province/cities (**Table 1**). Two of 11 (18%) surveillance units (Region 7 and Capiz) had an operational SPEED system pre-Haiyan. Capiz activated SPEED one day before landfall and Region 7 had SPEED ongoing as a 7.2 magnitude earthquake had struck the province of Bohol three weeks prior. Of the remaining nine surveillance units, eight (89%) had SPEED operational within one week post-Haiyan, and one (11%) was operational within seven weeks (Leyte).

PIDSR and ESR remained operational in five of 11 (45%) surveillance units without interruption of reporting. One (9%) surveillance unit had no interruption of ESR, but PIDSR was suspended until six weeks post-Haiyan.

The hardest hit areas, Leyte and Tacloban City, had variable interruptions of PIDSR and ESR surveillance activity. In Leyte, limited reporting was back online one week post-Haiyan. In Tacloban City, PIDSR and ESR activities were suspended until seven weeks post-Haiyan. In Tacloban City, SPEED was operational one week post-Haiyan; in Leyte, SPEED was operational seven weeks post-Haiyan.

Deactivation of SPEED occurred 17 weeks post-Haiyan in most (7/11) surveillance units. The number of weeks of activation ranged from 7 to 17 weeks (mean 15 weeks).

Ten of 11 (91%) surveillance units rated PIDSR as functional post-typhoon. Eight (73%) considered ESR functional. SPEED was rated functional by three (27%) surveillance units (**Table 1**).

In Leyte and Tacloban City, PIDSR and ESR were rated separately for functionality from November to December and January onward as their situations changed. In the first period, both rated the three systems to be not functional. In January and onward, Leyte rated the functionality as neutral for both PIDSR and ESR, and SPEED as not functional. Tacloban City rated the

[illegible]

ESR, Event-based Surveillance and Response; PIDSR, Philippine Integrated Disease Surveillance and Response; and SPEED, Surveillance in Post Extreme Emergencies and Disasters.

**Table 2. Reported functionality of the disease surveillance systems post-Haiyan, the Philippines, 2013–2014**

Surveillance units	Reported functionality of the surveillance system*			Complementarity of the disease surveillance systems†
	PIDSR	ESR	SPEED	
National	5	4	3	3
Region 6	4	5	3	5
Aklan	4	2	3	3
Antique	4	3	4	5
Capiz	4	3	4	5
Iloilo	4.5	5	3	5
Region 7	3	4	2	2
Cebu City	5	5	3	3
Region 8	4	4	2	2
Eastern Samar	4	4	4	4
Ormoc City	4	4	2	4
Leyte‡	1	1	0	3
	3	3	2	
Tacloban City‡	0	0	3	5
	4	4	4	

ESR, Event-based Surveillance and Response; PIDSR, Philippine Integrated Disease Surveillance and Response; and SPEED, Surveillance in Post Extreme Emergencies and Disasters.

\* < 1–2 – not functional; 3 – neutral; and 4–5 – functional.

† 1–2 – not complementary; 3 – neutral; and 4–5 – complementary.

‡ Two time periods were reported: November to December 2013 and January 2014 onwards.

three surveillance systems as functional at this time (Table 2).

Seven of 11 (63.6%) surveillance units reported that the three systems were complementary to each other post-Haiyan. Four (30.7%) rated the three systems as neutral and two (15.3%) rated them as less complementary to each other.

## DISCUSSION

This study shows that in most of the surveillance units in the areas affected by Typhoon Haiyan, the routine surveillance systems (PIDSR and ESR) were not disrupted. The disruption in the routine surveillance systems in other areas lasted for only one week post-impact except in Leyte and Tacloban City where it took seven weeks to activate routine surveillance. The delay was due to the extent of the devastation after Haiyan due to power and network failures as well as unavailability of surveillance officers who were typhoon victims themselves. Region 6 had less disruption in the operations of the two systems compared to Region 8, which could be related to the magnitude of the devastation in the latter that reduced

the ability to continuously perform routine surveillance activities.<sup>6</sup>

Almost all of the surveillance units had delayed activation of SPEED – which is recommended to be activated 48 hours after a disaster.<sup>4,7</sup> Despite extensive damage to the Region 8 health office, Tacloban City and Eastern Samar did activate SPEED the week immediately after Haiyan. This could be attributed to the haste at which emergency assistance was delivered by the national health office; other unaffected regional health offices; and from several international organizations.<sup>8</sup> In Leyte, SPEED was activated seven weeks after Haiyan because the health facilities were severely damaged, most of the health workers were affected and there was a threat to the peace and order in the area.

Most of the surveillance units rated the routine surveillance systems as being functional, but few reported SPEED as functional. Some respondents were not confident of the functionality of SPEED because they had encountered various difficulties upon its application. Some of the difficulties – lack of proficiency in performing the syndromic approach and reverting to paper-based



reporting due to power and network failures – have been reported previously for other similar systems.<sup>9</sup>

The majority of respondents reported that SPEED complemented PIDSR and ESR in such a manner that it guided the health officers to verify and validate the particular syndromes and the areas affected for possible outbreaks. Although ESR was functional also, events were not reported, most likely because this system also employs a syndromic approach similar to SPEED.

One limitation of this study is that the responses were subjective; therefore, different respondents may have different interpretations of functionality and whether the systems were complementary.

However, we observed that routine surveillance systems can function even after a disaster and more so when health infrastructures are less damaged. SPEED could be a useful disease surveillance system in future disasters or emergencies but may require better training among field workers. SPEED should not replace PIDSR and ESR as such systems can supplement the other two by rapidly generating reports from health units. Emphasis in disaster preparedness to establish the needed capability proficiency in health units to ensure the functionality of SPEED is required. We recommend refresher courses, simulations and on-site mentoring on SPEED to enhance the surveillance and health officer's capabilities.

### Conflicts of interest

None declared.

### Funding

This study was funded by WHO.

### Acknowledgements

We express our gratitude for the full support and cooperation of all PIDSR-ESR surveillance officers, Health Emergency Management Bureau and SPEED coordinators as well as all the health managers/officers from the national, regional and local government health offices in making this post-incident evaluation of disease surveillance systems possible.

### References

1. United States Center for Disease Control and Prevention (CDC). Rapid health response, assessment, and surveillance after a tsunami - Thailand, 2004–2005. *Mortality and Morbidity Weekly Report*, 2005, 54:61–64.
2. *Manual of procedures for the Philippine Integrated Disease Surveillance and Response, Third edition*. Manila, National Epidemiology Center, Department of Health, 2014.
3. Gallardo FDL et al. An assessment of the case notification system 16 months after Typhoon Haiyan in Region 8, the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):71–75. doi:10.5365/wpsar/2015.6.2.HYN\_002
4. *Manual of procedures for Surveillance in Post Extreme Emergencies and Disasters*. Manila, Department of Health, Philippines 2010.
5. Klaucke DN et al. Guidelines for evaluating surveillance systems. *Mortality and Morbidity Weekly Report*, 1988, 37(S-5):1–18 (<http://www.cdc.gov/mmwr/preview/mmwrhtml/00001769.htm>, accessed 1 October 2015).
6. Uscher-Pines L et al. Framework for the development of response protocols for public health syndromic surveillance systems: case studies of 8 US states. *Disaster Medicine and Public Health Preparedness*, 2009, 3 Suppl:S29–36. doi:10.1097/DMP.0b013e31819f4483 pmid:19491585
7. Buehler JW et al. Situational uses of syndromic surveillance. *Biosecurity and Bioterrorism*, 2009, 7:165–177. doi:10.1089/bsp.2009.0013 pmid:19635001
8. Peiris S Buenaventura J, Zagaria N. Is registration of foreign medical teams needed for disaster response? Findings from the response to Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):29–33. doi:10.5365/wpsar.2015.6.2.HYN\_014
9. Ridpath AD et al. Challenges to implementing communicable disease surveillance in New York City evacuation shelters after Hurricane Sandy. *Public Health Reports (Washington, D.C.)*, 2012, (January–February):2015.

# An assessment of the case notification system 16 months after Typhoon Haiyan in Region 8, the Philippines

Flor D' Lyn Gallardo,<sup>a</sup> Vikki Carr de los Reyes,<sup>a</sup> Ma Nemia Sucaldito,<sup>a</sup> Lilia Ligon-Imperio,<sup>a</sup> Johnette Peñas,<sup>a</sup> Niño Rebato<sup>a</sup> and Enrique Tayag<sup>a</sup>

Correspondence to Flor D' Lyn Gallardo (email: peachiegallardo@gmail.com).

**Introduction:** The Philippines Department of Health uses the Philippine Integrated Disease Surveillance and Response (PIDSR) system to monitor 25 diseases and syndromes that have the potential to cause outbreaks. The focus of this system is to strengthen the capacity of local government units for early detection and response to outbreaks. After Typhoon Haiyan, routine disease surveillance activities were suspended at the Epidemiology and Surveillance Units (ESUs) at the city and provincial levels, as well as laboratory services; surveillance resumed as soon as local conditions allowed.

**Method:** We conducted an assessment of PIDSR in March 2015, 16 months post-Haiyan, in Region 8, the most heavily affected region. We used key informant interviews and a review of data from the system to assess the core surveillance and support functions.

**Results:** All ESUs reported they were performing all surveillance core functions, although laboratory confirmation needed to be strengthened at the regional reference laboratory. Access to working communication equipment also needed improvement as did timeliness and completeness of reporting.

**Discussion:** Assessment of surveillance activities, resources and quality should be conducted post-disaster. The strength and operations of the disease surveillance system usually requires support from the local, regional and national governments, especially if there are legal mandates and legislation that includes the system in disaster planning. Regular monitoring of the system is recommended to ensure stability, system development, increased outbreak detection and fewer morbidities and fatalities.

Disasters challenge the capacity of surveillance systems in a variety of ways, including damage to communication infrastructure, closure of health-care facilities, unavailability of surveillance staff, loss of laboratory facilities and distractions by other prioritized response activities. Re-establishing disease surveillance and response capacity is an important priority post-disaster.<sup>1</sup> In a post-disaster setting, analysis of the role of routine health information systems has been limited.<sup>2</sup>

The Philippine Integrated Disease Surveillance and Response (PIDSR) system is a nationwide disease surveillance and response system.<sup>3</sup> The system monitors 25 diseases and syndromes that have the potential to cause an outbreak and that warrant an immediate response. An outbreak is suspected when there is unexpected clustering of cases in an area within a period of time or the number of cases reported exceeds the expected threshold. The diseases reported to PIDSR are categorized as

either Category 1 for immediate reporting (within 24 hours) or Category 2 for weekly reporting. Category 1 diseases are reported using case investigation forms that are disease specific and require immediate notification from city/hospital to province to regional level. Category 2 diseases are all reported on case report forms to a Regional Epidemiology and Surveillance Unit (RESU) every Friday. These forms are usually transmitted through email as metadata. If an Internet connection is not available, hard copies are sent through the mail or hand delivered to RESU for data entry. Feedback from RESU should be done every week, but often it is summarized and reported monthly.

Region 8, the region most affected by Haiyan, is composed of six provinces and eight cities with a population of 4 million. They adopted the PIDSR system in 2007 with Epidemiology and Surveillance Units (ESUs) at the provincial and city levels and sentinel hospitals serving as reporting units.<sup>4</sup>

<sup>a</sup> Epidemiology Bureau, Department of Health, Sta Cruz, Manila, Philippines.  
Submitted: 29 April 2015; Published: 6 November 2015  
doi: 10.5365/wpsar.2015.6.2.HYN\_002

In this study, we conducted an assessment of selected ESUs in Region 8 on core surveillance and support functions 16 months post-Haiyan. Using dengue as the representative disease, surveillance indicators such as timeliness and reporting rates in selected ESUs were also assessed for system performance.

## METHODS

A descriptive study using key informant interviews and records review was conducted to gather information on PIDSR operations 16 months after Typhoon Haiyan. The study focused on the support functions of the system – health workforce, communication equipment, access to Internet, availability of PIDSR forms and laboratory logistics. The six core surveillance functions based on WHO guidelines were assessed: case detection, case registration, reporting, confirmation, analysis and feedback.<sup>5</sup> Timeliness and reporting rate were also assessed using data obtained from January to February 2015 as per the Centers for Disease Control and Prevention guidelines for evaluating public health surveillance systems.<sup>6</sup>

Seven ESUs and two sentinel hospitals (9 of 14 [64%]) from Region 8 were selected for this assessment. The ESUs comprised the RESU, four Provincial ESUs (PESUs) and two City ESUs (CESUs). Face-to-face interviews using a guided questionnaire were conducted among surveillance staff, the head of the RESU, the chief of hospital ( $n = 1$ ) and the director of PESUs ( $n = 3$ ). Interviewees were asked to comment on the present status of PIDSR support functions.

PIDSR metadata were obtained from six reporting units to determine case detection and the timeliness of data entry post-Haiyan. These were PESUs from Biliran, Eastern Samar, Western Samar and Leyte and disease reporting units from the Eastern Visayas Regional Medical Center (EVRMC) and Leyte Provincial Hospital. Dengue notification reports from 1 January to 28 February 2015 were obtained. Dengue was chosen as the representative disease as vector-borne diseases remain a perennial problem in the area, and cases were expected to increase after Haiyan.<sup>7</sup> Timeliness was defined as the number of weekly reports received by the RESU from each PESU and CESU divided by eight (the total number of expected reports for the

eight-week period of study). The reporting rate was defined as the number of dengue files received at RESU from the ESUs divided by the total number of disease reporting units that regularly submit weekly reports. The target for both surveillance functional indicators was above 80%.

## RESULTS

### Surveillance support functions

At the time of the study, 16 months post-Haiyan, all seven ESUs and the two hospitals had diseases surveillance officers and most (8/9, 89%) had adequate information technology equipment for data management. However, seven (78%) did not have printers for report generation, seven (78%) reported having unstable and limited Internet access and eight (89%) reported that sending and receiving surveillance reports was challenging. All ESUs and hospitals had PIDSR forms available (Table 1).

Of the two hospital laboratories, one could do bacterial culture and hepatitis A IgM by ELISA detection (Table 1).

### Surveillance core functions

All reporting units were able to conduct case detection activities. One CESU and one hospital reporting unit were unable to do data entry from case forms due to other health service delivery tasks and rapid changes of health services delivery roles. Data entry was done by RESU staff for these reporting units.

Data transmission from the PESUs to the RESU varied 16 months post-Haiyan: case report forms from one PESU were hand-delivered, two were sent by email and one actively collected by RESU staff. The earliest data entry post-Haiyan was on 15 November 2013 at the RESU. This was seven days post-disaster; case registration resumed after one to 10 weeks at the provincial and city levels (Table 2).

RESUs did the routine analysis and dissemination of data to stakeholders through written or verbal feedback. No outbreaks were detected in these analyses and feedback.

Table 1. **Support functions of ESUs and sentinel hospitals, 16 months post-Haiyan in Region 8, the Philippines, March 2015 (*n* = 9)**

Epidemiology and surveillance unit/ sentinel hospital	Human resources (staff)	Resources					
		Computer	Printer	Internet access	Telefax	PIDSR forms	Laboratory supplies
ESUs							
RESU	4						—
PESU 1	1						—
PESU 2	2						—
PESU 3	2						—
PESU 4	2						—
CESU 1	3						—
CESU 2	1						—
Sentinel hospitals							
Hospital 1	2						
Hospital 2	2						

Legend: Blue, available; red, not available.

CESU, City Epidemiology and Surveillance Unit; ESU, Epidemiology and Surveillance Unit; PESU, Provincial Epidemiology and Surveillance Unit; and RESU, Regional Epidemiology and Surveillance Unit.

Table 2. **Core functions of the case notification system by ESUs and sentinel hospitals, 16 months post-Haiyan in Region 8, the Philippines, March 2015 (*n* = 9)**

ESUs/sentinel hospitals	Case detection	Case registration (start date of operation)	Confirmation (laboratory)	Reporting	Analysis	Feedback
<b>ESUs</b>						
RESU		15 Nov 2013	–			
PESU 1		4 Dec 2013	–			
PESU 2		26 Nov 2013	–			
PESU 3		4 Dec 2013	–			
PESU 4		12 Jan 2014	–			
CESU 1		17 Jan 2013	–			
CESU 2		Done by RESU	–			
<b>Sentinel hospitals</b>						
Hospital 1		6 Dec 2013				
Hospital 2		Done by CESU 4				

Legend: Blue, available; red, not available.

CESU, City Epidemiology and Surveillance Unit; ESU, Epidemiology and Surveillance Unit; and PESU, Provincial Epidemiology and Surveillance Unit; and RESU, Regional Epidemiology and Surveillance Unit.

## Timeliness and reporting rate

For the eight-week reporting period in January and February 2015, none of the four PESUs or two CESUs met the target of 80% for timeliness and reporting for dengue notifications; timeliness ranged from 13% to 63% and reporting from 2% to 50% (Table 3).

## DISCUSSION

This study shows that the re-establishment of PIDSR in Region 8 was slow after Typhoon Haiyan. Reasons for this included the massive destruction to health infrastructures, loss of human lives and resources, lack of electricity, impassable roads, non-functional telecommunication

Table 3. Timeliness and reporting rate of ESUs in Region 8, the Philippines, 1 January 2015 to 28 February 2015 ( $n = 6$ )

Epidemiology and surveillance units	Timeliness	Reporting rate
	Number of reports submitted on time/number of reports expected, morbidity week 8 (%)	Number of dengue reports submitted/number of reporting units, morbidity week 8 (%)
PESU 1	4/8 (50)	1/8 (13)
PESU 2	1/8 (13)	2/23 (9)
PESU 3	4/8 (50)	1/10 (10)
PESU 4	5/8 (63)	1/44 (2)
CESU 1	5/8 (63)	1/4 (25)
CESU 2	2/8 (25)	1/2 (50)

CESU, City Epidemiology and Surveillance Unit; ESU, Epidemiology and Surveillance Unit; and PESU, Provincial Epidemiology and Surveillance Unit.

systems and severely damaged data management equipment. Also, as in the Great Japan Earthquake,<sup>8</sup> many health workers were victims themselves and were unable to deliver health services. Directly after Haiyan, there were many difficulties in collecting vital health data and data for disease surveillance, thus monitoring disease trends became impossible.

The ESUs reported resuming surveillance activities one to 10 weeks post-Haiyan. Although this assessment showed that surveillance core functions were routinely being conducted, there was poor quality on timeliness and reporting rates observed in the surveillance reports submitted by ESUs. Reporting rates for support core functions were also variable due to lack of equipment for report generation. Better telecommunication and Internet access would have resulted in improved report transmission. While case detection, case registration and reporting of disease surveillance activities were reported as being stable, the analysis and feedback component of the surveillance system needed to be strengthened.

There also were no outbreaks detected through PIDSR in the time between Haiyan and this study. As PIDSR is an indicator-based surveillance system, the detection of outbreaks requires stable reporting and monitoring of the number of cases against a threshold. Thresholds are indicators of when the level of disease occurrence has been reached as an early warning for epidemics (alert threshold), and when the level of disease occurrence is above the expected range (outbreak threshold)<sup>9</sup> As there was irregular reporting

in the indicator-based surveillance system after Haiyan, it was not surprising that no outbreaks were detected. There were outbreaks of measles, dengue and acute gastroenteritis reported through the Philippines event-based surveillance and response system post-Haiyan, suggesting that event-based surveillance might be more useful in the post-disaster setting.

Laboratory capacity was also limited in the study area 16 months post-Haiyan, with only one hospital that could perform laboratory confirmation testing (e.g. bacterial culture). Most samples were sent to the Research Institute for Tropical Medicine in Manila for testing. Additional health facilities that can conduct laboratory procedures or mobile laboratories would be useful for future response efforts as adequate surveillance relies on laboratory testing being available. Enhancing laboratory capacity for disasters can be achieved through training more laboratory personnel and having surge capacity when disasters occur.<sup>10</sup>

This study had limitations. As it purposely selected those ESUs most affected by Haiyan, the results are biased towards a non-functioning surveillance system and may not be representative of all cities and hospitals. Also, surveillance functional indicators such as timeliness and reporting rate data pre-disaster were unavailable and therefore unable to be compared to our results. Other limitations are that some of the results rely on self-reporting which may lead to bias, that a full evaluation of all components of the surveillance system was not included and that the sample size was small (only two CESUs).

## CONCLUSION

In this post-Haiyan assessment, the re-establishment of PIDSR in Region 8 was slow and hampered by the impact of Haiyan. Communications support was not optimal; staff, when available, had other competing tasks; laboratory testing was done in one hospital and the subnational reference laboratory and the timeliness of reporting and reporting rates for dengue were low. Although case detection activities were being conducted in all reporting units, some data entry was being referred to RESU staff.

The operation of indicator-based surveillance systems, such as PIDSR, greatly depends on the support of the local, regional and national governments coupled with legal mandates and legislations. Based on this study, we recommend regular monitoring and evaluation of PIDSR to determine specific surveillance activity gaps and to review surveillance functionality. This should occur routinely at the regional, provincial and city levels and also post-disaster to assess how the system has recovered.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

We are grateful for the Epidemiology Bureau of the Department of Health (DOH) for allowing us to conduct this study. The authors would also like to thank the Regional Office of the DOH in Region 8 particularly Mr Boyd Roderick Cerro, disease surveillance officers, PIDSR coordinators and ESU heads of Eastern

Visayas for providing the information and data. We would also like to thank Dr Michael O'Reilly and Mr John Bobbie Roca for making this study possible.

### References

1. United States Center for Disease Control and Prevention (CDC). Rapid Health Response, Assessment, and Surveillance After a Tsunami - Thailand, 2004–2005. *Mortality and Morbidity Weekly Report*, 2005, 54:61–64.
2. Aung E, Whittaker M. *Preparing routine health information systems for immediate health responses to disasters*. Queensland, Health Information Systems Knowledge Hub, 2010 (<http://www.uq.edu.au/hishub/docs/WP12/HISHUB-WP12-FULL-13-WEB-24Sept12.pdf>, accessed 12 August 2015).
3. *Manual of Procedures for the Philippine Integrated Disease Surveillance and Response, Third edition*. Manila, National Epidemiology Center, Department of Health, 2014.
4. Tante S et al. Which surveillance systems were operational after Typhoon Haiyan? *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):66–70. doi:10.5365/wpsar.2015.6.2.HYN\_015
5. *Communicable disease surveillance and response system: guide to monitoring and evaluating*. Geneva, World Health Organization, 2006 ([http://www.who.int/csr/resources/publications/surveillance/WHO\\_CDS\\_EPR\\_LYO\\_2006\\_2.pdf](http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_EPR_LYO_2006_2.pdf), accessed 12 August 2015).
6. German RR et al.; Guidelines Working Group Centers for Disease Control and Prevention (CDC). Updated guidelines for evaluating public health surveillance systems: recommendations from the Guidelines Working Group. *Morbidity and Mortality Weekly Report – Recommendations and Reports*, 2001, 50 RR-13:1–35, quiz CE1–7. PMID:18634202
7. Aumentado C et al. The prevention and control of dengue after Typhoon Haiyan. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):60–65. doi:10.5365/wpsar.2015.6.3.HYN\_018
8. Arima et al. The Great East Japan Earthquake: a need to plan for post-disaster surveillance in developed countries, *Western Pacific Surveillance and Response Journal*, 2011, 2(4):3–6. doi:10.5365/wpsar.2011.2.4.007 PMID:23908893
9. *Administrative Order No. 2007–0036: Guidelines on the Philippine Integrated Disease Surveillance and Response (PIDSR) Framework (1 October 2007)*. Manila, Department of Health, 2007 (<http://docslide.us/documents/ao-2007-0036-pidsrpdf.html>, accessed 12 August 2015).
10. *Alert, response, and capacity building under the International Health Regulations (IHR): Role of the laboratory in surveillance*. Geneva, World Health Organization, 2007 ([http://www.who.int/ihr/lyon/surveillance/lab\\_surveillance/en/](http://www.who.int/ihr/lyon/surveillance/lab_surveillance/en/), accessed 12 August 2015).



# A snapshot of catastrophic post-disaster health expenses after Typhoon Haiyan

Noel Espallardo,<sup>a</sup> Lester Sam Geroy,<sup>b</sup> Raul Villanueva,<sup>a</sup> Roy Gavino,<sup>a</sup> Lucille Angela Nievera<sup>b</sup> and Julie Lyn Hall<sup>b</sup>

Correspondence to Lester Sam Geroy (email: lelism22@yahoo.com).

**Introduction:** This paper provides a snapshot of the health-care costs, out-of-pocket expenditures and available safety nets post-Typhoon Haiyan.

**Methods:** This descriptive study used a survey and document review to report direct and indirect health-care costs and existing financial protection mechanisms used by households in two municipalities in the Philippines at one week and at seven months post-Haiyan.

**Results:** Reported out-of-pocket health-care expenses were high immediately after the disaster and increased after seven months. The mean reported out-of-pocket expenses were higher than the reported average household income (US\$ 24 to US\$ 59).

**Discussion:** The existing local and national mechanisms for health financing were promising and should be strengthened to reduce out-of-pocket expenses and protect people from catastrophic expenditures. Longer-term mechanisms are needed to ensure financial protection, especially among the poorest, beyond three months when most free services and medicines have ended. Preparedness should include prior registration of households that would ensure protection when a disaster comes.

The Philippines is working towards universal health coverage (UHC), aiming to achieve equity of access to health care without its population suffering financial hardship. The country has a well-distributed public health care system that primarily serves low- and middle- income people, especially in rural areas. A strong private sector focused in urban areas primarily serves middle- and upper-income population.

The Philippine Health Insurance Corporation (PhilHealth) is the Philippines' social health insurance agency, and it currently provides coverage for inpatient and a few public health interventions, e.g. newborn screening, perinatal mother and child care and tuberculosis. Efforts in the last five years have increased PhilHealth enrolment coverage from 62% in 2010 to 83% in 2014.<sup>1,2</sup> A point-of-care enrolment policy was created in 2013 whereby eligible individuals are made automatic beneficiaries at the point of access to the health care system. A no-balance-billing policy, also created in 2013, mandates that no other fees be charged or paid by eligible patients in hospitals, aiming to reduce out-

of-pocket expenses. Currently, these policies only apply to the poor and vulnerable identified by the Department of Social Welfare and Development or by the hospitals' social welfare offices.<sup>3</sup>

Disasters and emergencies, such as Typhoon Haiyan that struck the central Philippines in November 2013, increase poverty and the vulnerability of the poor.<sup>4</sup> High out-of-pocket expenses for health care post-disaster can lead to poverty as observed in the Philippines.<sup>5,6</sup> Poverty incidence among families in Region 8 where Haiyan had the greatest impact was already 37% (2012).<sup>7</sup> The government had previously established provisions to strengthen social services to protect people from financial risk in emergencies. The Republic Act 8185 mandated that local governments allocate 5% of their internal revenue to a Calamity Fund to be used when a local or national state of calamity is declared. After Typhoon Haiyan, PhilHealth declared it would subsidize the health-care costs of typhoon-affected individuals (PhilHealth Circular Nos. 0034–2013 and 0006–2014).<sup>8–10</sup> PhilHealth also allowed delivery of

<sup>a</sup> Department of Family and Community Medicine, University of the Philippines, Philippine General Hospital, Taft Avenue, Manila, Philippines.

<sup>b</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

Submitted: 10 July 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_017

hospital reimbursements in advance of claims to enable rebuilding and rehabilitating health facilities (PhilHealth Circular Nos. 0004–2014 and 0024–2014).<sup>11,12</sup>

Disaster literature on health needs, operations and service delivery are abundant; publications on out-of-pocket payments, financial risk protection and catastrophic health expenditures are also available. But there is a paucity of literature on health financing and financial risk protection in disaster and emergency settings and longer-term sustainable health financing efforts.

This paper provides a snapshot of the health-care costs, out-of-pocket expenses and available safety nets post-Haiyan, raising their potential impact as catastrophic health expenditure. Costs and out-of-pocket expenses were examined during the response phase (one week after) and the transition to the recovery phase (seven months after). Costs and out-of-pocket expenses reflect supply- and demand-side realities, e.g. availability of health services and safety nets.

## METHODS

This descriptive study used interviews and reviews of hospital and PhilHealth documents to gather data on financial barriers to health care, direct and indirect health-care costs and existing financial protection mechanisms used by individuals. Data gathering was conducted from 1 October to 30 November 2014 for information that covered the period of November 2013 (one week after Haiyan) and June 2014 (seven months after). The two study sites – Sta Fe, Leyte, and Guiuan, Eastern Samar – were purposely selected for their economic status, access to PhilHealth-accredited health facilities and the presence of local and international aid.

Household interviews were conducted with 35 community respondents selected by purposive sampling, i.e. individuals who visited health centres and hospitals. Our interviews aimed to identify (1) potential barriers to using health services; (2) actual health-care costs such as for laboratory tests, medicines and professional fees after PhilHealth benefits had been deducted; and (3) benefits from PhilHealth, conditional cash transfers and other safety nets applied post-Haiyan. The respondents were categorized into two groups based on their monthly income: (1) less than or (2) more than US\$ 94 per month. We reviewed hospital and PhilHealth

data on claims and costs of health services, including professional fees, laboratories and medicines to validate the results.

Direct health-care costs were defined as the costs of labour, supplies, medicines and equipment to provide patient-care services. Indirect health-care costs included non-medical components of obtaining health care including transportation, lodging and home services. Once a household's financial health-care contribution exceeded 40%, after subsistence needs had been met, it was considered a catastrophic health expenditure.<sup>13</sup>

## RESULTS

Availability of funds for consultation and transportation were the main barriers to seeking health services. One week after Haiyan, 23 of 35 respondents (66%) reported they had no money for transportation or medical consultations (Table 1).

The monthly family income in the study sites ranged from US\$ 24 to US\$ 59. The reported health-care costs one week post-Haiyan ranged from zero, when free services were available, to that which exceeded monthly incomes, particularly for laboratory and medicines costs, even after PhilHealth subsidies and benefits were applied (Table 2). Financial barriers during the immediate phase were further aggravated by difficulty to access cash either from others, who also did not have cash; from local government; or from local banks.

In public health facilities, there was minimal out-of-pocket payment because of the no-balance-billing policy of PhilHealth. However, patients still had to purchase medicines and supplies if these were not available in these facilities. Records confirmed out-of-pocket payments ranged between US\$ 3 and US\$ 21 for medicines. Similarly, in private health facilities in Guiuan, patients had to pay the excess amount outside PhilHealth coverage which ranged from US\$ 11 to US\$ 21.

Seven months after the emergency, the reported costs of health care had increased. These were highest for professional fees in Sta Fe and hospital stays in Guiuan (US\$ 393 and US\$ 592, respectively). Overall, higher out-of-pocket expenses were found in Sta Fe compared with Guiuan. Mean health-care costs, except laboratory and transportation, were higher than the average

Table 1. Barriers to utilization of health services, Sta Fe, Leyte and Guiuan, Eastern Samar, the Philippines

Study sites	One week after		Seven months after	
	Frequency	Per cent (%)	Frequency	Per cent (%)
<b>Sta Fe, Leyte (n = 16)</b>				
Health facility is too far	3	20	2	17
Health facility is closed	0	0	0	0
No money for transportation	4	27	3	25
No money for consultation	5	33	7	58
Poor road conditions	3	20	0	0
<b>Guiuan, Eastern Samar (n = 19)</b>				
Health facility is too far	4	13	1	8
Health facility is closed	2	7	0	0
No money for transportation	9	30	6	46
No money for consultation	5	17	6	46
Poor road conditions	10	33	0	0

Table 2. Self-reported out-of-pocket expenses one week and seven months after Typhoon Haiyan, Sta Fe, Leyte and Guiuan, Eastern Samar, the Philippines (n = 35)\*

Study sites	One week after		Seven months after		Ratio of mean expenses
	Mean (US\$)	Range (US\$)	Mean (US\$)	Range (US\$)	
Sta Fe, Leyte					
Professional fee	0.00	0	393.00	—	—
Laboratory	3.50	—	393.00	—	112
Medicines	20.00	3.5–42	83.00	12–393	4
Hospital stay	0.00	0	393.00	—	—
Transportation	3.00	0.5–9	0.00	0	—
Guiuan, Eastern Samar					
Professional fees	21.00	—	226.00	5–1177	11
Laboratory	33.00	—	20.00	5–35	1
Medicines	29.00	5–71	158.00	5–1177	5
Hospital stay	0.00	—	592.00	7–1177	—
Transportation	1.00	0.5–2	35.00	0.5–82	35

\* All figures in US\$ at exchange rate of US\$ 1.00 = PhP 42.47 (2 June 2014). Values without range represent those with only one respondent.

household income (US\$ 24 to US\$ 59), which suggests it was catastrophic health expenditure. One respondent had a major surgical procedure (US\$ 1361). Review of hospital records and PhilHealth reimbursements seven months after the typhoon confirmed the high costs.

Community insurance was the main source of financial assistance for health care (16/35 respondents, 46%). Other sources were local government funds (9/35, 26%), PhilHealth reimbursement (8/35, 23%) and conditional cash transfer remittance (2/35, 6%). Households also reported borrowing necessary funds from relatives and local cooperatives. Financial

assistance from local governments was usually granted upon request from authorities. There were no reports of blanket cash relief for affected households.

Among the 35 respondents, 20 were in the category earning an average monthly income of less than US\$ 94, and 15 were in the group earning more than US\$ 94. Both groups self-reported similar proportions of PhilHealth membership (25–27%). A higher proportion of the poorest were registered under the National Household Targeting System for Poverty Reduction programme. However, the poorest received less support from local governments (30% versus 67%),

**Table 3. Declared PhilHealth and NHTS membership, safety nets and out-of-pocket expenses incurred among the poorest and near-poor, Sta Fe, Leyte and Guiuan, Eastern Samar, the Philippines ( $n = 35$ )**

Income level*	Total number	Declared PhilHealth membership	NHTS/ 4Ps member	Received conditional cash transfer	Received LGU support	Received community support	OOP one week after	OOP seven months after
≤ US\$ 94	20	25%	5%	None declared	30%	25%	55%	55%
> US\$ 94	15	27%	0%	None declared	67%	27%	53%	47%

\* US\$ 94.00 cut off is based on minimum monthly income levels in Region 8 from the Department of Labour and Employment.

LGU, local government unit; NHTS, National Household Targeting System for Poverty Reduction; OOP, out-of-pocket; and 4Ps, Pantawid Pamilyang Pilipino Program.

and they had more out-of-pocket expenses, especially seven months after the typhoon (55% versus 47%) (Table 3).

## DISCUSSION

This study showed that the self-reported costs of health care post-Haiyan were high with consultation and transportation costs as the main barriers to health service utilization. Out-of-pocket expenses, after PhilHealth benefits were deducted, particularly for professional fees and hospital stays, were alarming. Because of the no-balance-billing policy, respondents using public facilities reported no costs; hence, out-of-pocket expenses and costs represented private hospital services.

These high costs suggest catastrophic health expenditures. Another survey in Region 8 of 2766 postpartum women 11–13 months post-Haiyan showed that both public and private prenatal care had an average cost of US\$ 4 (range: US\$ 0 to US\$ 149), while the average cost of delivery was US\$ 73 (range: US\$ 0 to US\$ 2191).<sup>14</sup> Families with the reported average monthly income of US\$ 24 would be adversely affected by these health-care costs. Interestingly, official sources reported a higher average income in Region 8 than was reported in this study (US\$ 314 monthly in 2009).<sup>7</sup>

We observed that out-of-pocket expenses increased over the seven months after Haiyan. Within one week, health services were available in public facilities (e.g. Rural Health Units) as well as being provided by local or international nongovernmental organizations (NGOs). Essential medicines, when available, were also provided free of charge. This may explain why the reported out-of-pocket payments for professional fees and medicines were low at this time. By seven months, all hospitals and primary care facilities in the two study areas were

back in operation, roads were repaired making travel easier and more cash was in circulation. However, most international and local NGOs had left along with their free medicines.

Community insurance was the most accessed source of health financing at the local level in this study. Local government funds were not significant sources of support and were commonly only accessed through direct request from government officials. This was confirmed by another study where only 11–17% of households in Region 8 reported seeking assistance from the government, while 8–14% sought private assistance (NGO, charity, individuals or groups).<sup>15</sup> There was no information on how the local calamity funds were being spent, what proportion was earmarked for health or whether they were distributed as relief fund to local residents.

If the government is to be the main source of social safety nets post-disaster, mechanisms for implementation as well as the amount of investment required to mitigate catastrophic health expenditures need to be determined. The Philippines does not yet have updated or localized costing on how much capitalization or investment is needed. This is closely linked to determining the amount required for blanket cash relief for health if the country (or any donor) wanted to use this mechanism post-disaster. Both supply and demand interventions should be considered to enhance social safety nets for health post-emergency.

New initiatives for UHC include expansion of PhilHealth enrolment through point-of-care and no-balance-billing policies, expansion of primary care benefits subsidized by PhilHealth, price regulation for case-based payments, upgrading of health facilities, augmenting the health workforce (doctors, nurses and midwives) in rural and isolated areas and enhancing

the availability of medicines and reducing their cost. There is optimism that the country is on the right path. Current data from 2008 to 2013 demonstrate the distribution of health insurance is becoming more pro-poor.<sup>16,17</sup> However, findings from our study did not show preferential benefits of safety nets to the poorest. The government has increased its revenue for health through sin taxes, allowing it to subsidize 14.7 million new members.<sup>18</sup>

This descriptive study identified the patterns of costs, out-of-pocket expenses and safety nets during the response and the transition to recovery post-Haiyan. Limitations include a small sample size, reliance on self-reporting, recall bias as the survey was conducted seven months post-event, lost records and data gaps. No actual calculation of local health accounts was done. There was also no investigation on whether the costs were actually paid for from private funds or from government relief.

## CONCLUSION

When the next disaster hits the Philippines, people should not incur out-of-pocket payments for health care. Financial risk protection should be mainstreamed into preparedness, risk assessment, mitigation, planning, response and recovery plans. National and local policies and mechanisms for financial protection should clearly benefit the poorest. Knowledge gaps in health-care financing in disasters include demand questions (e.g. rate of impoverishment because of health care post-disasters) and supply questions (e.g. disaster subsidies/loans for private hospitals). The health system will need to focus on supply mechanisms to ensure the availability of health services and medicines at no or minimal cost with safety nets for the poorest households. Longer-term mechanisms are needed to ensure financial protection especially for the poorest beyond three months when the bulk of free services and medicines being provided by international responders end. Preparedness should include an intensive drive to enrol households in social health insurance or other mechanisms to ensure protection when the next disaster comes.

## Conflicts of interest

None declared.

## Funding

None.

## Acknowledgements

We thank the staff of the hospitals and PhilHealth offices in Sta Fe, Leyte and Guiuan, Eastern Samar for granting interviews and review of PhilHealth documents.

## References

1. *Official Gazette: PhilHealth Enrolment*. Pasay City, Philippine Health Insurance Corporation, 2014 (<http://www.gov.ph/report/philhealth-enrolment/>, accessed 18 September 2015).
2. Chapter 3: Financial risk protection through the National Health Insurance Program. In: *National Objectives for Health 2011–2016*. Manila, Department of Health, 2012 (<http://www.doh.gov.ph/sites/default/files/5%20Chapter3.pdf>, accessed 18 September 2015).
3. *Republic Act No. 10606: An act amending Republic Act No. 7875, otherwise known as the "National Health Insurance Act of 1995", as amended, and for other purposes*. Manila, Fifteenth Congress of the Philippines, 2013 (<http://www.gov.ph/2013/06/19/republic-act-no-10606/>, accessed 18 September 2015).
4. *PhilHealth Circular No. 024–2012: Entitlement to NHIP benefits of all Pantawid Pamilyang Pilipino Program beneficiaries of the DSWD (29 May 2012)*. Pasig City, Philippine Health Insurance Corporation, 2012 ([http://www.philhealth.gov.ph/circulars/2012/circ24\\_2012.pdf](http://www.philhealth.gov.ph/circulars/2012/circ24_2012.pdf), accessed 18 September 2015).
5. Shepherd A et al. *The geography of poverty, disasters and climate extremes in 2030*. London, Overseas Development Institute, 2013 (<http://www.odt.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8633.pdf>, accessed 18 September 2015).
6. *Disaster-conflict interface: comparative experiences*. France, Bureau for Crisis Prevention and Recovery, United Nations Development Programme, 2011 ([http://www.preventionweb.net/files/20432\\_20432undpdisasterconflictinterface2.pdf](http://www.preventionweb.net/files/20432_20432undpdisasterconflictinterface2.pdf), accessed 18 September 2015).
7. National Statistical Coordination Board. *Family income statistics*. Manila, Philippine Statistics Authority, 2014 ([http://www.nscb.gov.ph/secstat/d\\_income.asp](http://www.nscb.gov.ph/secstat/d_income.asp), accessed 18 September 2015).
8. Manasan RG. *Expanding social health insurance coverage: new issues and challenges (Discussion Paper Series No. 2011–21)*. Manila, Philippine Institute for Development Studies, 2011 (<http://dirp4.pids.gov.ph/ris/dps/pidsdps1121.pdf>, accessed 18 September 2015).
9. *PhilHealth Circular No. 0034–2013: Guidelines on the provision of special privileges to those affected by a fortuitous event (15 November 2013)*. Pasig City, Philippine Health Insurance Corporation, 2013 ([http://www.philhealth.gov.ph/circulars/2013/circ34\\_2013.pdf](http://www.philhealth.gov.ph/circulars/2013/circ34_2013.pdf), accessed 18 September 2015).
10. *PhilHealth Circular No. 0006–2014: Supplement to PhilHealth Circular 34, series of 2013: Guidelines on the provision of special privileges to those affected by Typhoon Yolanda (24 January 2014)*. Pasig City, Philippine Health Insurance Corporation, 2013 ([http://www.philhealth.gov.ph/circulars/2014/circ06\\_2014.pdf](http://www.philhealth.gov.ph/circulars/2014/circ06_2014.pdf), accessed 18 September 2015).

11. *PhilHealth Circular No. 0004–2014: Implementation of the interim reimbursement mechanism (IRM) for health care institutions in areas directly affected by ‘Super Typhoon Yolanda’* (28 January 2014). Pasig City, Philippine Health Insurance Corporation, 2014 ([http://www.philhealth.gov.ph/circulars/2014/circ04\\_2014.pdf](http://www.philhealth.gov.ph/circulars/2014/circ04_2014.pdf), accessed 18 September 2015).
12. *PhilHealth Circular No. 0024–2014: Implementation of the interim reimbursement mechanism (IRM) for health care institutions in areas directly affected by ‘Super Typhoon Yolanda’ (Revision 1, 23 October 2014)*. Pasig City, Philippine Health Insurance Corporation, 2014 ([http://www.philhealth.gov.ph/circulars/2014/circ24\\_2014.pdf](http://www.philhealth.gov.ph/circulars/2014/circ24_2014.pdf), accessed 18 September 2015).
13. Xu K et al. Household catastrophic health expenditure: a multicountry analysis. *Lancet*, 2003, 362:111–117. doi:10.1016/S0140-6736(03)13861-5 pmid:12867110
14. Dayrit MM et al. *Assessing access to prenatal, delivery and postpartum services in the Eastern Visayas Region, Philippines: Final Technical Report to the World Health Organization Philippines*. Quezon City, Ateneo Center for Health Evidence, Action and Leadership (A-HEALS), 2015.
15. Ravago MLV et al. Eastern Visayas after Yolanda: evidence from household Survey. *Policy Notes*, 2014, 2014–05 (<http://www.stat.upd.edu.ph/docs/misc/PN%202014-5.pdf>, accessed 18 September 2015).
16. Ulep VG, de la Cruz NA. *Analysis of out-of-pocket expenditures in the Philippines*. Manila, Philippine Institute for Development Studies, 2014 ([http://dirp4.pids.gov.ph/webportal/CDN/EVENTS/Ulep\\_OOP%20Analysis%20Ulep%20July%202.pdf](http://dirp4.pids.gov.ph/webportal/CDN/EVENTS/Ulep_OOP%20Analysis%20Ulep%20July%202.pdf), accessed 18 September 2015).
17. Bredenkamp C, Buisman L. *Financial Risk Protection in the Philippines: What do we know?* Manila, PhilHealth International Conference, 2015 (<http://www.philhealth.gov.ph/2015intlconf/benefits/FinancialProtectionInThePhilippinesWhatDoWeKnow.pdf>, accessed 18 September 2015).
18. A strong ally to achieve KP: 4 out of 5 Filipinos now covered. *The DOH files*, 2014, 1(3):1–2 (<http://www.doh.gov.ph/sites/default/files/DOHJULY.pdf>, accessed 18 September 2015).



# Medicines management in the Philippine public sector during the response to Haiyan

Roderick Salenga,<sup>ab</sup> Yolanda Robles,<sup>a</sup> Monet Loquias,<sup>a</sup> Francis Capule<sup>a</sup> and Anna Melissa Guerrero<sup>c</sup>

Correspondence to Roderick Salenga (email: [salengar@wpro.who.int](mailto:salengar@wpro.who.int) or [ericsalenga@gmail.com](mailto:ericsalenga@gmail.com)).

**Introduction:** Health service delivery in the Philippines is constantly challenged by disasters and emergencies. This descriptive study documented existing policies for medicines management in the Philippines and then assessed these in the public sector response post-Haiyan.

**Method:** We used desk a review of existing laws, regulations and related issuances and a series of interviews of key informants from various national and local health agencies.

**Results:** We found that while numerous national policies covered critical aspects of medicines management, implementation post-Haiyan was problematic at all levels of the decentralized health-care system. We identified issues of quantification, warehousing, distribution, utilization monitoring and disposal. Donated medicines also added additional burden for storage and disposal, especially for expired and unwanted medicines.

**Discussion:** While the process of managing medicines during disasters did not differ greatly from non-emergency situations, the Haiyan experience highlighted the system's weaknesses. With the current gaps in implementation, as well as the logistical obstacles brought about by disasters, there is a need to have integrated mechanisms for medicines management in the Philippines. This assessment provided an important opportunity to review the medicines management policies at national and local levels.

Medicines management is the entire process of how medicines are selected, procured, delivered, prescribed, administered and reviewed to optimize the contribution they make to producing informed and desired outcomes of patient care.<sup>1</sup> In the Philippines, medicines management occurs at all levels of government and is different during emergency and non-emergency times.

Health service delivery in the Philippines has been repeatedly disrupted as a result of disasters and emergencies – particularly so after Typhoon Haiyan in November 2013. The objectives of this study were to document existing policies for medicines management in the Philippines during emergency and non-emergency periods and to assess the public sector medicines management system in Haiyan-affected areas during the response.

## METHODS

This qualitative study used a desk review of existing regulations on medicines management, plus 39 semi-structured interviews with heads and/or authorized representatives of the following organizations: national agencies ( $n = 5$ ), regional Centers for Health and Development ( $n = 3$ ), regional warehouse facilities ( $n = 3$ ), Department of Health (DOH)-retained hospitals ( $n = 3$ ), provincial and district hospitals ( $n = 10$ ), provincial and city health offices ( $n = 4$ ), rural health units ( $n = 5$ ) and village health stations ( $n = 6$ ). All local health facilities were from the most severely hit regions (Regions 6, 7 and 8). Questions asked were mainly on the processes implemented in managing medicines during non-emergency and emergency situations. The interviews were conducted approximately one year after Haiyan between September and October 2014.

<sup>a</sup> College of Pharmacy, University of the Philippines, Manila, Philippines.

<sup>b</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>c</sup> Pharmaceutical Division, Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 15 June 2015; Published: 6 November 2015

doi: [10.5365/wpsar.2015.6.2.HYN\\_012](https://doi.org/10.5365/wpsar.2015.6.2.HYN_012)

Data gathered from the key informant interviews were transcribed verbatim and subjected to content analysis using interpretive techniques such as coding and recursive abstraction.

## RESULTS

### Existing policies

#### *Medicines for regular (non-emergency) programmes*

DOH is the governing agency mandated to provide national policy direction, plans, technical standards and guidelines for health.<sup>2</sup> Local government units (LGUs) are granted autonomy and responsibility for their own health services but receive guidance from the DOH through their regional offices (ROs). Procurement of medicines by both national and local governments is through competitive bidding process.<sup>3</sup>

DOH is primarily responsible for the management of medicines for vertical programmes (tuberculosis, etc.), medicines access programmes (cancer, etc.) and for emergencies and disasters. These programmes are independently managed by several offices within the DOH. Medicines are distributed through the RO to both the DOH and health facilities managed by LGUs – hospitals (provincial, city and district), rural health units and village health stations. LGUs manage their procured medicines.

The push method predominantly governs procurement and distribution planning in the public sector. In this method, supply sources at one level in the system determine what types and quantities of medicines will be delivered to lower levels.<sup>4</sup>

#### *Medicines during emergencies and disasters*

Medicines in the DOH Package List for Emergencies and Disasters are managed by the Health Emergency Management Staff (HEMS). These medicines serve to augment supplies at the local health facilities. Where possible, immediately pre-disaster, HEMS estimates the types and quantities of medicines which may be required for response and recovery efforts at the regional level. These are then consolidated into a procurement plan.

Once a supplier is approved by a central office for bids and awards, the medicines are delivered

to the DOH and samples are collected by Food and Drug Administration (FDA) for testing. The Materials Management Division then distributes the medicines to the ROs, which in turn distribute them to LGUs. LGUs will allocate to their respective local health facilities.

Local governments are permitted to make additional emergency purchases. This emergency procurement does not enter the usual bidding process, rather it only requires the approval of the local chief executive (e.g. municipal mayor).

#### *Administrative issuances*

There are four administrative orders (AOs) that relate to medicines management during emergencies and disasters. AO 2012–0013 stipulates that all government agencies must allocate at least 5% of their maintenance and other operational budget for logistics during emergencies and disasters.<sup>5</sup> AO 2004–0168 defines the rules of engagement and sharing of resources and responsibilities for provision of medical services, specifying the DOH as the lead agency.<sup>6</sup> The other two AOs outline the responsibilities of different institutions in ensuring the availability of medicines, instructions for donated medicines and how any warehoused supplies (before disaster) may be used for emergencies and disasters (AO 2003–54A<sup>7</sup> and AO 2007–0017<sup>8</sup>).

After confirming that international donations are listed on the national formulary, initial clearance is provided by the Bureau of International Health Cooperation. FDA provides the final clearance before the Bureau of Customs releases the items.

### Assessment of medicines management post-Haiyan

#### *Availability of medicines*

Lack of coordination among facilities and ineffective feedback mechanisms during the response to Haiyan were consistently reported by participants. Management functions were exercised at all levels by different agencies and individuals. For national programmes, medicines continued to be managed independently by each programme group. At the same time, LGUs procured their own medicines supply. Neither national nor local sources were able to track stock levels accurately. Not all donated medicines were registered at the DOH.

The National Online Stock Inventory Reporting System, developed in 2007 to monitor the availability of medicines in the public sector, was not particularly helpful during response and recovery efforts. It required internet connectivity, and electricity was not restored to many affected areas until four months post-Haiyan.

### *Distribution of medicines*

Post-Haiyan, it was reported that medicines were delivered either to the DOH central and regional warehouses or directly to LGU health facilities, depending on the agreement made with suppliers at the time. These arrangements made coordination between and among programmes difficult and also made the mobilization of available medicines an inefficient process. Tracking the movement of medicines was not standardized. For most of the national programmes, distribution was considered complete once medicines were delivered to a regional warehouse. This was despite there often being limited qualified personnel to handle medicines once they had been delivered to the warehouse.

Post-Haiyan, the push method was inadequate as the quantities of medicines distributed were not based on need; therefore, both stock-outs and overstocking were reported. Many donated medicines were distributed by various groups at different levels of the health-care system and at different sites without a national control mechanism.

### *Monitoring utilization of medicines*

There was no unified recording system for monitoring medicines distribution at any level; therefore, the integration of data and accessing real-time information of stock levels were difficult. Many facilities initiated their own manual process of recording medicines consumption.

### *Disposal of medicines*

It was reported that on several occasions, national policies for accepting donations were not followed, which led to the acceptance of large quantities of short-dated, expired and unnecessary medicines. These occupied

a lot of space in the already crowded warehouses and created an additional burden to dispose of them.

## DISCUSSION

The Philippines has a complex medicines supply system; while the process of managing medicines during disasters is not greatly different than the usual practice, the response to Haiyan highlighted the system's weaknesses. Existing problems at various stages of the medicines management cycle were amplified.

Clearly defined policies at the national level did not translate well to the LGU level. When medicines reached regional facilities and the distribution was considered complete by the DOH, there was a failure to recognize that most regional facilities did not have mechanisms in place to distribute stocks to target recipients. Given the damage caused by Haiyan, there was no alternative for the physical transfer of stock so the medicines remained in storage. Storage facilities were inadequate due to the damage to existing facilities and the massive influx of donated medicines.

National guidelines for accepting donations and handling pharmaceutical wastes were not fully implemented in health facilities. The absence of reliable drug consumption data also prevented authorities from moving to a pull system of distribution during recovery.

This study has limitations. The findings cannot be generalized to all regions and LGUs due to the participants being from selected regions, and their experiences and opinions may not be representative. The impact of the disaster on the medicines management system was unable to be quantified. Because there was no formal assessment before Haiyan, pre- and post- comparisons were not possible. However, as Haiyan was worse than any other typhoon in the country's recorded history, the context of the study is truly exceptional.

## CONCLUSION

This study found that while national policies on managing medicines during disasters were in place, implementing these in a decentralized and devastated health system was difficult. The lack of coordinated processes and tools

to facilitate easy and timely monitoring of medicines availability, distribution and consumption led to either overstocking or understocking of medicines. Processing large volumes of donated medicines combined with a decentralized procurement system in a post-disaster setting meant that storage facilities were overwhelmed and had limited skilled human resources. Receiving short-dated, near-expiry and unnecessary items which could not be easily distributed caused an additional burden to the health system as they needed to be safely disposed.

An integrated system that bridges the gap between the national government and various health facilities should be in place to ensure equitable access to medicines and reduce resource wastages in times of disasters.

### Conflicts of interests

None declared.

### Funding

This work was funded by the WHO Representative Office in the Philippines.

### Acknowledgements

The authors wish to acknowledge Mr Jean-Michel Cann, Ms Shasta Daisy Triumfante, Ms Justine Urias and Mr Philip Edward Balbas.

### References

1. *A spoonful of sugar – medicines management in NHS hospitals*. United Kingdom, Audit Commission, 2011 (<http://archive.audit-commission.gov.uk/auditcommission/sitecollectiondocuments/AuditCommissionReports/NationalStudies/nrspoonfulsugar.pdf>, accessed 8 April 2015).
2. *Republic Act No. 7160: An act providing for a Local Government Code of 1991*. Quezon City, Eighth Congress of the Philippines, 1991 ([http://www.lawphil.net/statutes/repacts/ra1991/ra\\_7160\\_1991.html](http://www.lawphil.net/statutes/repacts/ra1991/ra_7160_1991.html), accessed 12 August 2015).
3. *Republic Act No. 9184: An act providing for the modernization, standardization and regulation of the procurement activities of the government and for other purposes*. Quezon City, Twelfth Congress of the Philippines, 2002 (<http://www.bsp.gov.ph/downloads/procurement/ra9184.pdf>, accessed 12 August 2015).
4. *Management of drugs at health centre level: training manual*. Brazzaville, World Health Organization Regional Office for Africa, 2004 (<http://apps.who.int/medicinesdocs/pdf/s7919e/s7919e.pdf>, accessed 12 August 2015).
5. *Administrative Order No. 2012-0013: Policy and guidelines on logistics management in emergencies and disasters (2 July 2012)*. Manila, Department of Health, 2012 (<http://recordsvr.doh.gov.ph/appnet/public/p/ai/searchall.htm>, accessed 3 September 2015).
6. *Administrative Order No. 2004-0168: National policy on health emergencies and disasters (9 September 2004)*. Manila, Department of Health, 2004 (<http://recordsvr.doh.gov.ph/appnet/public/p/ai/searchall.htm>, accessed 3 September 2015).
7. *Administrative Order No. 2003-54A: Guidelines on the processing and clearance of importations through donations by the Department of Health (6 June 2003)*. Manila, Department of Health, 2003 (<http://www.fda.gov.ph/attachments/article/153563/AO%2054-A%20s.%202003.pdf>, accessed 3 September 2015).
8. *Administrative Order No. 2007-0017: Policies and guidelines in the conduct of foreign and surgical missions (FSMM) in the Philippines (28 May 2007)*. Manila, Department of Health, 2007 (<http://files.enonline.net/attachments/412/ao2007-0017.pdf>, accessed 3 September 2015).

# Social media as a risk communication tool following Typhoon Haiyan

Christine Tiffany Cool,<sup>a</sup> Marie Chantal Claravall,<sup>a</sup> Julie Lyn Hall,<sup>a</sup> Keisuke Taketani,<sup>a</sup> John Paul Zepeda,<sup>a</sup> Monika Gehner<sup>b</sup> and Olivia Lawe-Davies<sup>b</sup>

Correspondence to Christine Tiffany Cool (email: christinecool@coolconsulting.net).

**Problem:** In the aftermath of Typhoon Haiyan, the World Health Organization (WHO) Representative Office in the Philippines had no social media presence to share timely, relevant public health information.

**Context:** Risk communication is essential to emergency management for public health message dissemination. As social media sites, such as Facebook, are popular in the Philippines, these were adopted for risk communication during the response to Haiyan.

**Action and outcome:** The WHO Representative Office in the Philippines established Facebook, Twitter and Instagram accounts. Thirty days after these social medial channels were established, a gradual increase in followers was observed. Facebook saw the largest increase in followers which occurred as posted content gradually evolved from general public health information to more pro-active public health intervention and preparedness messaging. This included information on key health interventions encouraging followers to adopt protective behaviours to mitigate public health threats that frequently occur after a disaster.

**Lessons learnt:** During the response to Haiyan, creating a social media presence, raising a follower base and developing meaningful messages and content was possible. This event underscored the importance of building a social media strategy in non-emergency times and supported the value of developing public health messages and content that both educates and interests the general public.

## PROBLEM

Typhoon Haiyan affected over 16 million people in the Philippines with the health of people in affected areas threatened by outbreak-prone diseases and other public health risks.<sup>1</sup> Infrastructure across all sectors was completely devastated and access to essential health-care services was limited. Mobilizing appropriate response measures took time. Therefore an emergency risk communication (ERC) plan was required to communicate with the public. As part of this ERC plan, social media was suggested as a way to enhance traditional ERC to the affected population.

Usually a social media strategy starts during non-emergency times. However, before Typhoon Haiyan, the World Health Organization (WHO) Representative Office in the Philippines had no social media presence for sharing timely, relevant public health information. The primary focus during the acute phase of a response is

to rapidly release essential public health information to a large population. This paper therefore describes how social media was used to enhance traditional ERC and how a social media presence allowed for the broad and rapid dissemination of public health information in the response to Haiyan.

## CONTEXT

Risk communication is an essential component of crisis or emergency management and is one of the core capacities required under the International Health Regulations.<sup>2</sup> In a disaster response, risk communication to affected communities ensures that interventions are evidence-based and include a range of capacities at each stage of the emergency (i.e. preparedness, response and recovery). It encourages informed decision-making, positive behaviour change and maintains the public's trust in those handling the emergency.<sup>3,4</sup>

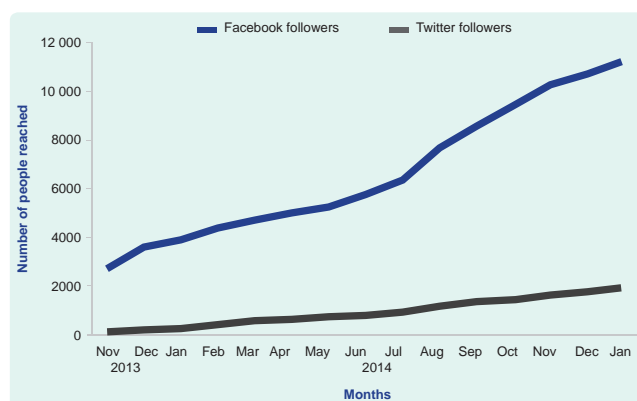
<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> WHO Headquarters, Geneva, Switzerland.

Submitted: 15 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_013

**Figure 1. Number of social media followers on WHO accounts by month after Typhoon Haiyan, November 2013 to January 2015**



In recent times, social media has played an important role in public health message dissemination, particularly as a tool in emergency preparedness and response.<sup>5</sup> Pro-active communication provides important health information and advice for the public to adopt protective behaviours that augment disease surveillance post-disaster, reduce public confusion and allow for better resource allocation.<sup>4</sup>

The Philippines, with a population of almost 100 million, had 34 million active Facebook users in 2014 – 97% of people living in urban areas and 69% of rural dwellers were accessing Facebook.<sup>6</sup> Social media users were estimated to be spending on average four hours and 12 minutes on social media each day.<sup>6</sup> The WHO Representative Office in the Philippines published bi-weekly health cluster bulletins as well as early warning alert and response reports on their website; however, the office did not have any other digital mechanism to disseminate information other than its website and traditional media channels.

## ACTION

### Platform for information dissemination

Typhoon Haiyan destroyed all telecommunications in the affected areas – there was no telephone, Internet or power until 20 November 2013 (12 days after the typhoon). By 27 November 2013 (19 days after the typhoon), a Facebook page for the WHO Representative Office in the Philippines was established; by 2 December 2013 (24 days after the typhoon), Twitter and Instagram accounts were also established by WHO.

To assess the impact of these social media platforms, the monthly number of followers and posts were obtained from the Facebook and Twitter accounts between 27 November 2013 and 30 January 2015. The reach of a post on Facebook was defined as the number of views each post received in the first 28 days as reported on Facebook analytics. This included posts viewed by people on more than one device (e.g. desktop computer, mobile device and/or laptop). “Followers” were defined as a person or organization that ‘liked’ or ‘followed’ one of these social media accounts.

The Facebook account was prioritized as it had more users in the Philippines, particularly in rural areas, compared to other social media. Twitter only accounted for 40% of social media users in rural populations.<sup>6</sup> There was an increase in the number of followers on both Facebook and Twitter, although this was more marked for Facebook (Figure 1). There was also an increase observed for the Instagram account (data not shown).

According to WHO policy, all social media posts and followers have to be generated organically. This policy posed a great challenge to the social media team as it had to rely on followers that actively sought out the WHO social media pages, which were being generated for the first time, rather than using mechanisms where content is placed in social media accounts. Because of this, the social media team had to figure out how to use agencies with an established social media presence, such as Health Cluster partners, health officials, local government and celebrities, to encourage their followers to keep up to date with WHO health responses and priorities for the typhoon-affected area without the help of paid social media advertisements.

### Shift in messages: Reaching affected populations

The initial content of posts on Facebook provided information about the WHO emergency response and comprised mostly photos and text. As the risk communication needs evolved during the response, so too did the posts. Public health messages (e.g. that drinking boiled water was essential) were gradually replaced with messages encouraging the public to take protective actions against public health threats that commonly follow disasters. In July 2014, Typhoon Glenda made landfall in Manila, and so the social media message content post-Haiyan included preparation



messages for Glenda as well. The presentation of content also changed, with more illustrative infographics showing people what to do; these resulted in further reach and more followers (**Table 1**).

As the content of social media became more informed by technical input from both WHO and the Department of Health, working collaboratively to align policy and practice with social media messaging, the number of people reached per post increased (**Table 1**). An infographic on immunization resulted in a 76% increase in people reached over two months; this infographic was seen by 3190 people over 28 days. An infographic on breastfeeding in disasters reached 9636 people within 28 days, compared to a photo and text that reached only 1354 people in the same time period.

The ERC strategy also relied on the collaboration of WHO with Health Cluster partners. During daily meetings, the needs of those in the affected areas were discussed along with the activities being undertaken. The social media outputs were also reported, some of which were disseminated with partners such as UNICEF and the Department of Health, for example the promotion of breastfeeding in disasters. This opportunity to collaborate with partners increased the social media coverage.

The social media team was able to track the performance of each post through the Facebook analytics tool which helped in identifying the type of content that gained the greatest reach. For example, the “Health at the Heart of Healing” campaign called for people to post a picture of themselves making a heart gesture with their hands to show support for those in affected areas. Within the first week of the campaign, 170 entries were distributed to all WHO hubs in the Typhoon Haiyan-affected regions. Participation in this campaign included Philippines government officials, Health Cluster partners, health officials, overseas Filipino workers and WHO staff in the Philippines and in the European Region and Region of the Americas. Traditional media reported on the social media campaign, featuring the health priorities in affected areas six months after the typhoon.

## LESSONS LEARNT

As the ERC plan was developed during the response to an emergency, parameters for defining its success


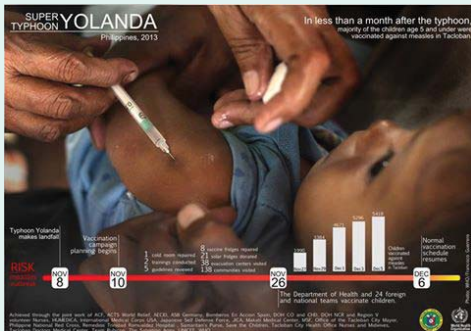




and evaluating the effectiveness of the strategy were not established. The importance of system evaluation was one of the primary lessons learnt. Evaluation is integral to determining the impact that communication interventions and activities have on behaviour change and the public’s risk perception. It also determines whether the messages are being received, understood and adopted by target groups. WHO was only able to evaluate the social media campaign using the number of views and likes from the social media posts. Although post views increased, whether the content resulted in offline engagement could not be assessed. Evaluation has been added to the updated WHO ERC standard operating procedures for implementation in future emergencies.

Some ways to determine whether social media messaging resulted in offline engagement is to conduct a survey of offline behaviours, have response teams observe behaviours to see if they align with social media messages or to verify through media monitoring if any changes in risk perception or behaviour change had occurred in the affected areas.<sup>3</sup>

Another main lesson learnt was that a social media presence should be established during non-emergency periods. This would give the team more time to establish a follower base, test the content that was most engaging and develop and test evaluation mechanisms to track the effectiveness of activities and interventions. If these mechanisms were in place, whether online activity translated to offline engagement could be determined.

Since affected populations measure, in part, the effectiveness of an emergency response based on the amount of information they have access to at any given time,<sup>7</sup> effective ERC and coordination among partners is crucial. As each partner has different priorities, different aspects of the response are emphasized through social media. Getting essential public health information to the affected population and ensuring alignment with both national and international partners was challenging. A mechanism to facilitate effective coordination with various partners should be implemented. Creating an ERC subgroup to meet after the daily Health Cluster meetings would allow partners to discuss the best way to address ERC priorities.

Table 1. Thematic posts and reach by message, WHO Philippines Facebook page, 8 November 2013 to 8 November 2014

Immunization in affected areas	
<p><b>Date posted: 27 Nov 2013</b>  <b>Number of people reached: 752</b></p> <p>Immunization is a cost-effective intervention to save lives especially in the aftermath of a disaster.          Like this photo if you agree!</p> <p>The objective of the current Expanded Program on Immunization of WHO Philippines is to prevent morbidity and mortality among children under five years old in disaster stricken areas and to reduce the risk for vaccine-preventable disease outbreak in evacuation centres and communities.... <a href="#">See More</a></p> 	<p><b>Date posted: 5 Jan 2014</b>  <b>Number of people reached: 3190</b></p> <p>We continue to work towards healthy communities in areas affected by Typhoon Yolanda (Haiyan).          Over 50 000 children under five years of age were vaccinated in 138 communities. During the campaign, children immunized against polio and measles were also screened for malnutrition. Normal vaccination schedule resumes this 2014 to provide immunity to all children in the affected areas of Typhoon Yolanda.          Immunization activities were conducted with support from our health partners... <a href="#">See More</a></p> 
Breastfeeding in disasters	
<p><b>Date posted: 5 Dec 2013</b>  <b>Number of people reached: 1354</b></p> <p>Breastfeeding is vital for babies in typhoon-affected areas          "This is my fourth child. I breastfed all my children for two years; and I will do the same with Aleya. It is the safest feeding option for both mother and child. It is economically sound; and it is also the most practical way to feed a baby," says Ormoc school teacher Rovelin Agner with her 3 day old daughter Aleya at the Ormoc District Hospital. <a href="#">#YolandaPH</a> <a href="#">#YolandaHealth</a> <a href="#">#WHOPhilippines</a>          Read more about the... <a href="#">See More</a></p> 	<p><b>Date posted: 15 Jul 2014</b>  <b>Number of people reached: 9636</b></p> <p>Preparing for #Glenda? Be aware of the dangers of breastmilk substitutes and make sure that your baby receives proper nutrition in emergencies. Babies aged up to 6 months need only breastmilk.  <a href="#">#NutritionMonth2014</a>          Source: National Nutrition Council, WHO</p> 
Public health information and messages (preparedness and response)	
<p><b>Date posted: 15 Jul 2014</b>  <b>Number of people reached: 3874</b></p> <p>Health tips to keep in mind as the country braces for #GlendaPH</p> 	<p><b>Date posted: 8 Nov 2014</b>  <b>Number of people reached: 61 408</b></p> <p>One year ago today, over 6000 lives were taken and millions of people were affected in the <a href="#">#PhilippinesAfterYolanda</a>. The WHO continues to support the recovery of health systems in <a href="#">#Haiyan</a> affected areas one year on! <a href="#">#YolandaPHneverforget</a></p> 

## CONCLUSION

Social media was used for the first time by WHO in the Philippines as part of the ERC strategy in the response to Typhoon Haiyan. Creating a social media presence and organically generating a follower base was challenging, especially amidst such a large-scale humanitarian emergency. However, that the number of Facebook and Twitter followers increased over time suggested that these social media channels did allow for increased reach. Lessons learnt included having an evaluation strategy as part of the campaign, establishing the social media platforms during non-emergency times and improving collaboration between partners in the dissemination of social media content.

The power of social media is that users can leverage existing social networks to generate discussion or provide information on important issues, and it represents a cost-effective tool for ERC.<sup>4</sup> The ability to communicate in real-time enhances traditional ERC as it allows for rapid dissemination of public health information. Using social media in an emergency response should be part of all ERC strategies.

## Conflicts of interest

None declared.

## Funding

None.

## Acknowledgements

We thank the following people for their input: Rachel Parry, Paulo Lyra, Nyka Alexander, Christina Banluta, Faith Kilford-Vorting, Ruth Foxwell, Aphaluck Bhatiasavi, Rosemarie Aguirre and Ivan Escartin. We also thank all those that responded to our campaign.

## References

1. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. *International Health Regulations implementation: ensuring effective responses to public health emergencies – strengthening risk communication capacities of national systems*. Geneva, World Health Organization, 2012 ([http://www.who.int/ihr/about/07\\_risk\\_communication.pdf](http://www.who.int/ihr/about/07_risk_communication.pdf), accessed 13 August 2015).
3. *World Health Organization outbreak communication planning guide*. Geneva, World Health Organization, 2008 (<http://www.who.int/ihr/library/WHOOutbreakCommsPlanningGuide.pdf>, accessed 13 August 2015).
4. Merchant RM, Elmer S, Lurie N. Integrating social media into emergency-preparedness efforts. *New England Journal of Medicine*, 2011, 365:289–291. doi:10.1056/NEJMp1103591 pmid:21793742
5. Fung IC-H et al. The use of social media in public health surveillance. *Western Pacific Surveillance and Response Journal*, 2015, 6(2):3–6. doi:10.5365/wpsar.2015.6.1.019
6. Kemp S. *Social, Digital & Mobile in APAC 2014*. London, WeAreSocial, 2014 (<http://wearesocial.net/tag/philippines/>, accessed 13 August 2015).
7. O'Malley P, Rainford J, Thompson A. Transparency during public health emergencies: from rhetoric to reality. *Bulletin of the World Health Organization*, 2009, 87:614–618. doi:10.2471/BLT.08.056689 pmid:19705012

# Restarting the tuberculosis programme post-Haiyan

Woojin Lew,<sup>a</sup> Rosalind Vianzon,<sup>b</sup> Anna Marie Celina Garfin<sup>b</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Woojin Lew (email: leww@who.int).

**Problem:** Typhoon Haiyan damaged or destroyed health infrastructure, equipment and services essential to the Philippine National Tuberculosis Programme (NTP), and it had to be re-established in the affected areas in Regions 6, 7 and 8. Continuing treatment and restoring diagnostic capacity were also challenging.

**Context:** The Philippines has one of the highest tuberculosis (TB) burdens in the world. At the time of Typhoon Haiyan, there were an estimated 26 600 TB cases on treatment at directly observed treatment, short-course (DOTS) centres and 356 multidrug-resistant TB cases registered at programmatic management of drug-resistant TB (PMDT) sites. As TB was not included in the Philippines early-warning post-disaster surveillance system, tracking TB patients was difficult after Haiyan.

**Actions and outcomes:** Immediately following Haiyan, each aspect of the NTP was assessed to determine the extent of damage. TB patients were traced and services restored. We created maps showing the location of temporary TB diagnostic and treatment services, which hastened referrals. We provided new laboratory equipment, training and rapid testing capabilities in the affected regions. All TB services in the affected areas (473 DOTS, 490 TB microscopy and six PMDT facilities) were restored just two months after Haiyan.

**Lessons learnt:** Key lessons learnt from the NTP experience following Typhoon Haiyan were: (1) the importance of having an electronic TB registry (database); (2) the need to include TB in the post-disaster surveillance system; (3) clear guidelines for TB control in disasters; and (4) the importance of coordination with all partners.

## PROBLEM

The Philippines is an incredibly disaster-prone country,<sup>1</sup> and as a result, the government and its citizens have experience in disaster preparedness, response and recovery. However, tuberculosis (TB) control in a disaster has been somewhat neglected. In the areas where facilities, records and equipment were damaged by Typhoon Haiyan, the Philippine National TB Control Programme (NTP) had to be re-established quickly.

## CONTEXT

The Philippines has the eighth highest TB burden in the world and the second highest in the World Health Organization (WHO) Western Pacific Region.<sup>2</sup> In 2013, the estimated incidence of TB in the Philippines was 292 cases per 100 000 population.<sup>2</sup> Improvements to case detection, treatment success, and access to services especially in difficult geographic and socioeconomic

settings have been observed.<sup>3</sup> When Typhoon Haiyan hit the central Philippines on 8 November 2013, there were approximately 26 600 TB patients and 356 multidrug-resistant TB cases (MDR-TB) under treatment in the affected area.<sup>4</sup>

Since the overall disaster response focused on surgical intervention and preventing disease outbreaks, TB did not receive much attention in the initial response. TB was not included in the Surveillance in Post Extreme Emergencies and Disasters (SPEED) system, an early warning surveillance system that becomes operational following disasters, which uses a syndromic approach to identify consultation trends in health facilities and evacuation centres.<sup>5</sup> Post-Haiyan, the highest priority for the NTP was to ensure that existing TB patients continued to receive treatment, which posed two significant challenges: (1) locating all existing TB patients; and (2) facilitating full treatment for these patients. Another priority was to restore diagnostic

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> National TB Control Programme, Infectious Diseases Office, Department of Health, Sta Cruz, Manila, Philippines.

Submitted: 3 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_009

Table 1. **Functional status of DOTS, microscopy and PMDT facilities in Regions 6, 7 and 8, the Philippines, 2013\***

Facility	Number of functional facilities					
	before Haiyan	1 week after	2 weeks after	4 weeks after	6 weeks after	8 weeks after
DOTS	473	294	312	316	376	473
TB microscopy centre	490	338	351	359	398	490
PMDT	6	4	5	6	6	6

\* Based on data provided by regional coordinators.

DOTS, directly observed treatment, short-course; TB, tuberculosis; and PMDT, programmatic management of drug-resistant TB.

capability as soon as possible to detect undiagnosed TB cases in the community. We report on the actions taken and lessons learnt from the re-establishment of the NTP in these affected areas.

## ACTION

### Restoring the TB referral system

In the days immediately following Typhoon Haiyan, regional and provincial TB coordinators from affected areas in Regions 6, 7 and 8, health emergency management staff, and other partners conducted an assessment of the 473 directly observed treatment, short-course (DOTS) facilities, 490 TB microscopy centres and six programmatic management of drug-resistant TB (PMDT) facilities. They assessed the level of damage to the facilities, the availability of human resources, the status of microscopy services, the adequacy of drug supply and the condition of records and reports. These assessments were repeated until all facilities were deemed functional at eight weeks post-Haiyan ([Table 1](#)).

The NTP and WHO prepared guidelines for the provision of TB services in areas affected by Haiyan<sup>6</sup> and these were distributed to the three most affected Regional Health Offices (RHOs) and their health partners on 2 December 2013. The guidelines outlined how to conduct a rapid assessment to determine the current status and availability of diagnostic equipment, human resources, drug supply, facilities, records and reports. It instructed the RHOs on how to re-establish DOTS services to ensure all existing TB patients resumed treatment as soon as possible. Lastly, it provided guidance for the management of presumptive TB and new TB cases including MDR-TB; improving TB laboratory services; and logistics management, supervision and monitoring.<sup>6</sup>

By 9 December 2013, a month after Haiyan, using the results from the initial assessments, maps were created that detailed the location of the operational DOTS and PMDT diagnostic and treatment services ([Figures 1a](#) and [1b](#)). These maps were the basis of a referral system and allowed local and foreign medical teams on the ground to know where to refer TB patients and suspected TB cases. Contact details of key staff and operational centres through the Health Cluster network were also collected in the assessments and included maps that facilitated rapid referrals.

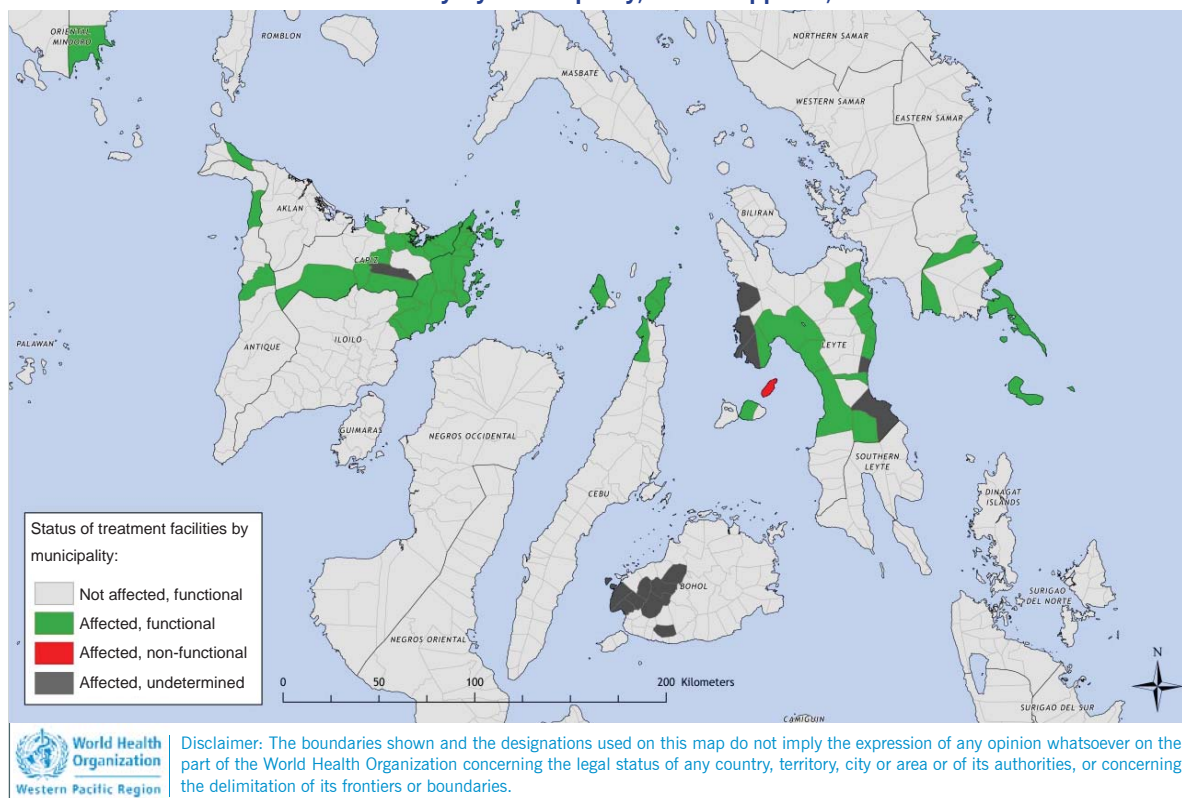
### Restoring laboratory capacity

Typhoon Haiyan had impacted the diagnostic capability in the affected areas. Approximately two thirds of the health infrastructure in the affected regions were not functional one week after the typhoon hit ([Table 1](#)). To strengthen laboratory capacity in diagnosing TB, including rifampicin (RIF)-resistant TB, Haiyan-affected regions were prioritized for delivery of Xpert® MTB/RIF assay machines (Xpert; Cepheid, USA). These machines were considered suitable as they have a rapid diagnostic turnaround time of two hours and do not require a sophisticated laboratory infrastructure, a special facility or condition to be installed.<sup>7</sup> Two Xpert machines belonging to the National TB Reference Laboratory were initially deployed to the Eastern Visayas Regional Medical Center on 27 January 2014 with eight additional Xpert units shipped to affected areas in February 2014. There were no Xpert machines in the affected areas before Haiyan.

Following the needs assessments and an official request from the Department of Health in May 2014, WHO procured 50 Light Emitting Diode (LED) microscopes that could operate on either electric or solar power. These were distributed through the NTP to prioritized health units in the affected areas.

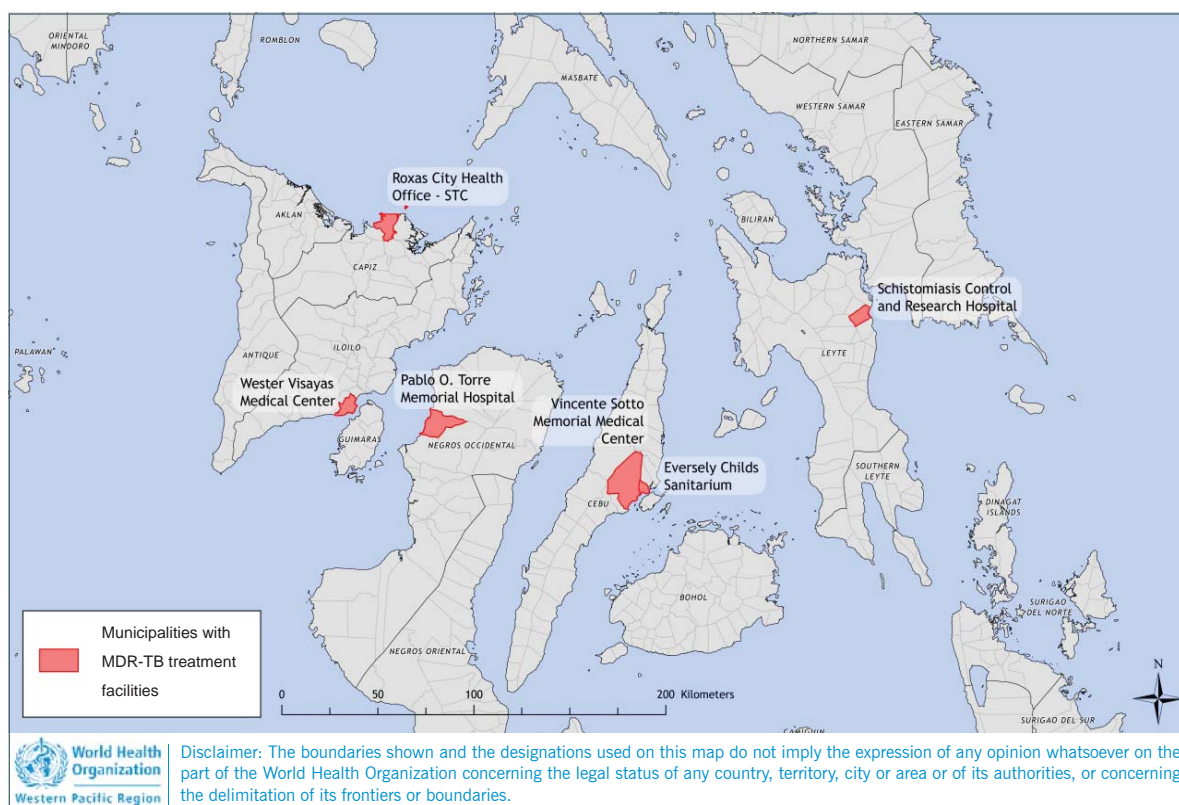


Figure 1a. Status of TB-DOTS functionality by municipality, the Philippines, 9 December 2013



Note: Green colour indicates that DOTS facilities in municipalities were physically damaged, but TB treatment services were available. Red colour indicates that TB treatment service was not available. Black colour indicates that information on functionality of TB services was not available yet.

Figure 1b. Status of MDR-TB functionality by treatment centre, the Philippines, 9 December 2013



Note: Out of six MDR-TB centres, Schistosomiasis Control and Research Hospital in Leyte province was completely damaged but restored its MDR-TB diagnosis and treatment in a tent within four weeks after the typhoon.

DOTS, directly observed treatment, short-course; MDR-TB: multidrug-resistant tuberculosis.



In the initial stages of the response, microscopes were shared and medical technologists rotated among neighbouring health units. Suspected TB cases or their sputum samples were transferred to health facilities that had microscopy services. WHO supported two trainings on Xpert testing in February and March 2014 where 22 laboratory technicians received hands-on training. An additional five trainings on LED microscopic examination were also conducted for 60 microscopists in May and June 2014.

The necessary equipment required to detect and manage TB cases: anti-TB drugs; forms (treatment card, identification card, NTP laboratory register, TB register); laboratory supplies (sputum cups, reagents); equipment (microscopes and Xpert MTB/RIF machines); and policies were packed in a single container and distributed through NTP.

## OUTCOME

Within two months of the typhoon, TB DOTS services were completely restored to pre-typhoon levels ([Table 1](#)). This collaborative effort showed the extraordinary dedication of NTP staff. Most of the case notes and records were lost, but the health staff recalled the names of many of their TB patients, and follow-up was conducted through village health workers, relatives and family members of patients. One of the completely destroyed Regional Health Units, a health facility which serviced a population of approximately 21 000, continued to provide TB treatment services on a daily basis in a tent.

In many instances, the high rate of resumption of TB DOTS services was due to patients returning to DOTS facilities once they opened. Health workers recorded the number of people who had received treatment before the typhoon, who had received treatment after the typhoon and those who were reported as having died or were missing. The less affected health facilities were able to trace close to 100% of their TB patients. As well as this, there were 7944 suspected TB cases that underwent smear microscopy tests and 1101 new smear positive cases on treatment by March 2014.

One PMDT site was completely destroyed; however, it became fully functional in four weeks using tents once the roads to the facility were cleared. Second-line TB drugs, particularly levofloxacin, were supplied through PMDT and Philippines Business of Social Progress or

Global Fund channels. Fortunately, the records of patents with MDR-TB were stored in an electronic database, and all 356 MDR-TB patients were located. In the five undamaged PMDT facilities, all MDR-TB patients were back on treatment within 2–16 days post-Haiyan; it took almost 12 weeks for the severely damaged PMDT centre to get all patients back on treatment. By mid-February 2014, all 356 MDR-TB patients were back on treatment.

Although it took time to restore normal TB drug delivery and distribution, no drug shortage was experienced in the affected areas. It is the usual practice in the Philippines for the TB DOTS facility to store and gradually distribute a six-month drug supply for new TB cases. After Haiyan, those stored medicines were shared to cover the temporary shortage of medicines until normal supplies resumed.

This paper has some limitations. First, an accurate number of TB patients registered at DOTS facilities in Regions 6, 7 and 8 before Haiyan was unavailable as paper-based TB records were missing or damaged in most affected areas. Not being able to compare the number of cases pre- and post-Haiyan limited the assessment of the NTP response at DOTS facilities for tracking and getting patients back on treatment. Treatment outcomes such as treatment success rates and default rates were also unavailable for pre-Haiyan; therefore, the negative impact of the typhoon on treatment compliance could not be assessed. The number of new TB cases detected could also not be compared between pre- and post-typhoon, which limits the assessment of case-finding activities at the facility level that could help indicate the level of NTP recovery.

## LESSONS LEARNT

The first lesson learnt from Typhoon Haiyan was the importance of an electronic TB registry of DOTS patients, not just the MDR-TB patients. Not having baseline data for comparisons pre- and post-Haiyan limited our ability to assess the response; relying on paper-based records was not feasible in this disaster-prone region. Adding TB to SPEED should be considered to assist in finding TB patients for referral to the NTP as soon as possible. Clear policies and guidelines for TB control in disasters are needed for better preparation, response and recovery for future disasters,<sup>8</sup> including specific monitoring and evaluation indicators that will allow for comparisons

to be made pre- and post-disaster. It is necessary to coordinate and collaborate with all partners involved in the response to more effectively and efficiently meet the needs of TB patients in affected areas.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

We thank the regional and provincial TB coordinators and other partner organizations that assisted in re-establishing TB programmes.

### References

1. McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
2. *Global Tuberculosis Report 2014*. Geneva, World Health Organization, 2014 ([http://www.who.int/tb/publications/global\\_report/en/](http://www.who.int/tb/publications/global_report/en/), accessed 15 August 2015).
3. Vianzon R et al. The tuberculosis profile of the Philippines, 2003–2011: advancing DOTS and beyond. *Western Pacific Surveillance and Response Journal*, 2013, 4(2):11–16. doi:10.5365/wpsar.2012.3.4.022 pmid:24015366
4. *Typhoon Haiyan (Yolanda) one year on: fact sheet*. Manila, World Health Organization in the Philippines, 2014 (<http://www.wpro.who.int/philippines/mediacentre/features/yolanda/factsheetcommmd.pdf?ua=1>, accessed 27 August 2015).
5. Tante S et al. Which surveillance systems were operational after Typhoon Haiyan? *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):66–70. doi:10.5365/wpsar.2015.6.2.HYN\_015
6. *Department Memorandum No. 2013–0347: Guidelines in the provision of TB services in post-disaster areas affected by super typhoon Yolanda (2 December 2013)*. Manila, Department of Health, 2013 (<http://recordsvr.doh.gov.ph/appnet/public/p/ai/searchall.htm>, accessed 27 August 2015).
7. *Rapid implementation of the Xpert MTB/RIF diagnostic test: technical and operational 'how-to' practical considerations*. Geneva, World Health Organization, 2011 ([http://apps.who.int/iris/bitstream/10665/44593/1/9789241501569\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/44593/1/9789241501569_eng.pdf), accessed on 15 August 2015).
8. *Administrative Order No. 2014–0032: Guidelines for the scaling up and use of Xpert MTB/RIF as rapid TB diagnostic tool under the NTP (29 September 2014)*. Manila, Department of Health, 2014 (<http://recordsvr.doh.gov.ph/appnet/public/p/ai/searchall.htm>, accessed 27 August 2015).

# Is my drinking a problem? A community-based alcohol intervention programme post-Haiyan in Tacloban City

Adam Edward Czaicki,<sup>a</sup> Gloria Fabrigas,<sup>b</sup> Allison Gocotano<sup>a</sup> and Julie Lyn Hall<sup>a</sup>

Correspondence to Allison Gocotano (email: [gocotanoa@who.int](mailto:gocotanoa@who.int) or [allisongocotano@gmail.com](mailto:allisongocotano@gmail.com)).

**Problem:** Evidence on alcohol use following disasters is scarce. After Typhoon Haiyan in the Philippines we wanted to determine whether there were alcohol-related problems among the disaster survivors and to strengthen the appropriate local health service support in Tacloban City.

**Context:** Tacloban City is a highly urbanized city that was one of the areas worst hit by Typhoon Haiyan. Prior to Haiyan there was very little support for people with alcohol problems, and the rehabilitation facility was located about 40 km away.

**Action:** A pilot community-based alcohol intervention programme was conducted that included: assessment of the extent of alcohol problems in the community and health-care workers baseline knowledge and skills; training of health-care workers on primary care alcohol intervention provision; and community outreach with post-training supervision.

**Outcome:** The alcohol screening found 26 (22%) of those attending healthcare facilities would benefit from some form of alcohol intervention. Health-care workers knowledge on basic alcohol intervention was low. This was strengthened during the training, and at outreach clinics the trained health-care workers were able to identify people with alcohol problems and provide them with treatment plans.

**Lessons learnt:** We learnt that there was a problem with alcohol in Tacloban City and that it was possible to run an alcohol intervention programme in the community using minimal resources. Addressing alcohol-related issues in the community is an important public health intervention. While there is a need for policies and guidelines at the national level, a community-based intervention is possible to establish with referral mechanism to specialized care. Training modules for such programs can be further developed and institutionalized.

## PROBLEM

Alcohol is widely used around the world in socio-cultural and traditional means; excessive use as a coping mechanism for emotional stress also occurs.<sup>1</sup> Alcohol has been causally related to at least 60 medical conditions with 4% of the global burden of disease attributable to alcohol.<sup>2</sup> Total alcohol consumption in the Philippines has been projected to increase from 5.6 litres of pure alcohol per capita consumption in 2015 to 6.5 litres in 2025, which suggests there will be an increase in demand for alcohol-related health services in the future.<sup>3</sup>

Among survivors of Hurricane Katrina, alcohol and drug consumption was associated with greater post-traumatic stress disorder symptoms.<sup>4</sup> However, it has been shown that alcohol use disorders post-disaster were more likely a recurrence or continuation of pre-existing

problems as opposed to new incidents.<sup>5,6</sup> This increase in alcohol use is caused by accumulated traumatic events and stressors and that contribution of point-in-time mass traumatic events subsides over time. A more recent study among Norwegian survivors of the 2004 South-East Asia tsunami showed that disaster exposure was associated with both self-perceived increases and decreases in drinking.<sup>7</sup> Overall, evidence in post-disaster alcohol use needs to be strengthened.

In the Philippines, a country that experiences many disasters, there is no national policy or action plan for alcohol problems or community-level support from the government for persons with alcohol problems. There are no alcohol restrictions set on alcohol outlet density, availability at public events, serving intoxicated persons or sales at petrol stations and no legally binding regulations on alcohol advertising and sponsorship. There is the Ad Standard Council, a self-regulating mechanism of the

<sup>a</sup> Office of the WHO Representative in the Philippines, Sta Cruz, Manila, Philippines.

<sup>b</sup> Mayor Alfred's Social Action Health Service Unit (MASA), Tacloban City, Philippines.

Submitted: 30 June 2015; Published: 6 November 2015

doi: 10.5365/wpsar.2015.6.2.HYN\_016

local advertising body that, in their 2012 guidebook, prescribed the inclusion of the words “drink responsibly” in alcohol product advertisements.<sup>8</sup> There are health warning labels on alcohol containers and a national maximum legal blood alcohol concentration of 0.05% when driving a vehicle; however, there is no national monitoring system in place and no effective means of enforcement.<sup>3</sup> The Anti-Drunk and Drugged Driving Act, passed only in 2013, focuses on penalizing people driving under the influence of alcohol but does not cover any provision for rehabilitation.

As part of the response to Typhoon Haiyan in November 2013, the Mental Health Gap Action Programme (mhGAP) was conducted by the World Health Organization (WHO) and Department of Health (DOH) and other key stakeholders.<sup>9</sup> As part of this mental health initiative, the WHO Representative Office in the Philippines piloted a community-based alcohol intervention programme in Tacloban City, one of the areas worst hit by Typhoon Haiyan, to determine the extent of alcohol-related problems and to train local health staff to provide community-based alcohol intervention services.

## CONTEXT

Tacloban City is a highly urbanized city with a population of 221 174.<sup>10</sup> Prior to Haiyan, interventions for harmful alcohol use were not part of the local health services and there were no community groups (e.g. Alcoholics Anonymous) for people to seek help.

The Comprehensive Dangerous Drugs Act of 2002 mandated that DOH manage the Drug Abuse Treatment and Rehabilitation Centers nationwide,<sup>11</sup> but these were intended for drug dependence only. Neither the law nor the manual for rehabilitation centres included rehabilitation for alcohol problems. This is despite four of the accredited centres including alcohol rehabilitation as part of their institution’s name.<sup>12</sup> These centres provide facility-based interventions with outpatient services for follow-up. Mental health services are not available at the primary care level in the entire country, and this is only now being addressed through lobbying of the Philippine Mental Health Act of 2014.<sup>13</sup>

The DOH-accredited rehabilitation facility within Region 8 is located about 40 km outside Tacloban City.<sup>12</sup> Access to this facility is difficult for people with low

incomes because of this distance from the city and also because clearances from village, police and regional trial court are required for admission.<sup>14</sup> There have been no patients treated for alcohol disorders at this facility, likely due to inaccessibility and the non-functioning referral system from primary care. There are tertiary-level hospitals within Tacloban City and one has a psychiatry department that can provide medical support for detoxification. However, as the main referral hospital catering to the entire region, it is always full of patients, understaffed and lacks resources.

We were unable to find any report of a community-based intervention for alcohol rehabilitation in the Philippines. This is despite experiences in other lower- to middle-income countries that have shown that medical treatment and detoxification of mild to moderate alcohol withdrawal can be safely managed in outpatient settings under the supervision of community nurses supported by local medical practitioners.<sup>15</sup> Treatment research suggests that early intervention at the primary care level can be both feasible and effective for heavy drinkers who do not have evidence of severe alcohol dependence, medical or psychiatric complications.<sup>2</sup>

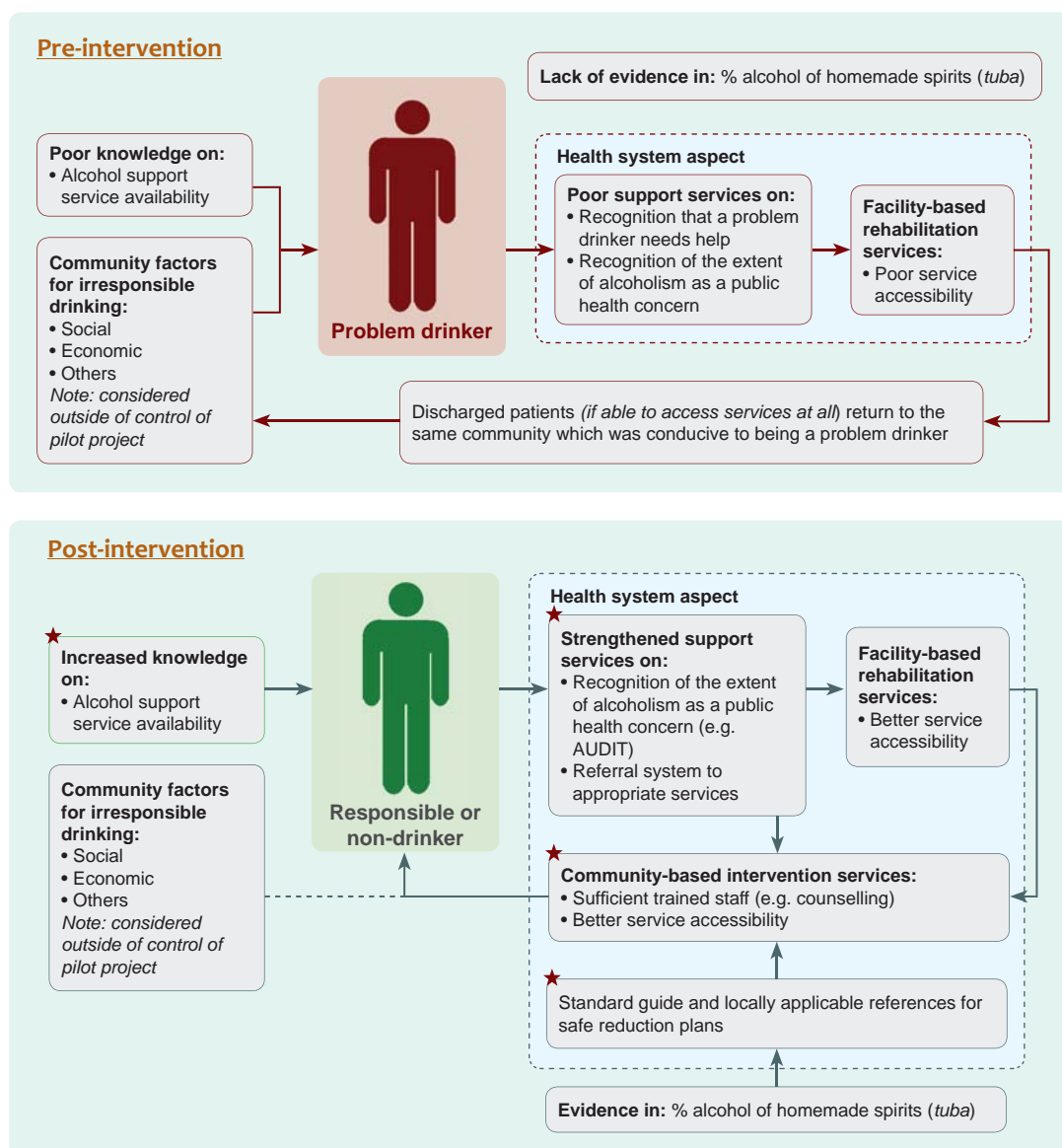
## ACTION

The pilot community-based alcohol intervention programme had three components: assessment, training and outreach. Assessment measured baseline alcohol-related problems within Tacloban City and the knowledge and skills of local health staff regarding alcohol and safe and effective treatment options. Training taught a team of local health workers to provide alcohol intervention services. Outreach involved supervising local health workers to screen and provide interventions to patients with alcohol problems. Underpinning this pilot was a conceptual framework which highlighted the opportunities for implementing community-based alcohol interventions (**Figure 1**). Homemade spirits that had no accurate alcohol percentage was a barrier in designing safe reduction plans.

### Assessment

The initial assessment was conducted in three urban sites located near the city centre: the Mayor Alfred Social Action Health Service Unit (MASA), Sagkahan Health Center and Tacloban City Hall. MASA is the main health care centre in the city and provides community outreach

Figure 1. **Conceptual framework for the community-based alcohol intervention programme, Tacloban City, the Philippines, 2015**



services to surrounding villages. Nurses regularly travel to hard-to-reach locations to provide basic health services.

We used two tools for the assessment: (1) the CAGE questionnaire, which is a screening tool with four yes/no questions;<sup>16</sup> and (2) the Alcohol Use Disorders Identification Test (AUDIT), a more sensitive tool for measuring alcohol dependence and harmful drinking patterns which comprises 10 questions and was recommended in mhGAP.<sup>17</sup> A score of 7 and above on the AUDIT tool was considered indicative of harmful alcohol use requiring some intervention.<sup>18,19</sup>

The two questionnaires were translated into local languages by local health staff and project consultants. Nursing staff administered the tools at all three sites to adults seeking medical treatment, their companions and people in public waiting areas. Between 2 and 6 February 2015, CAGE was initially administered to adults ( $\geq 18$  years) who provided verbal consent. However, the results showed that 166 (70%) of respondents required an alcohol intervention which seemed unrealistic. Therefore, the more sensitive AUDIT tool was used and, after orientation of staff, was administered at the same sites from 12 to 18 February 2015.

Table 1. Number and percentage of respondents with alcohol problems post-Haiyan in Tacloban City, the Philippines, 2015

Alcohol problem risks	CAGE n (%)	Total n (%)	AUDIT*	
			Female n (%)	Male n (%)
Low	73 (30.5)	67 (57.3)	56 (75.7)	11 (25.6)
Medium	134 (56.1)	24 (20.5)	12 (16.2)	12 (27.9)
High	32 (13.4)	26 (22.2)	6 (8.1)	20 (46.5)
<b>Total respondents</b>	<b>239 (100.0)</b>	<b>117 (100.0)</b>	<b>74 (100.0)</b>	<b>43 (100.0)</b>

\* AUDIT scores by intervention adapted in this pilot: low risk, 0–2; medium risk, 3–6 (needs alcohol education); high risk,  $\geq 7$  (7–15, needs simple advice; 16–19, plus brief counselling and continued monitoring; and 20–40, referral to specialist for diagnostic evaluation and treatment). Sixty-seven respondents answered 0–2.

AUDIT, alcohol use disorders identification test; CAGE, a screening tool with four yes/no questions.

## Training

A training programme was developed based on the alcohol-related problems, challenges and experiences observed by health-care staff and community members. It was open to participants with varied technical health backgrounds including community volunteers, social workers and medical doctors. The training, delivered mostly through lectures, consisted of alcohol unit conversion and low-risk drinking guidelines,<sup>20</sup> the effects of alcohol on health, Foetal Alcohol Spectrum Disorder, mental health, alcohol dependency and screening tools (AUDIT). Training for the health-care staff included medications used to treat alcohol disorders.

Pre-topic assessments were conducted to determine existing knowledge before the training; for example, participants were provided with a human body outline and were asked to draw which organs were affected by alcohol.

There was a separate training session for nursing staff from the alcohol unit in the treatment centre and MASA that focused on designing safe reduction plans (the gradual decrease in alcohol consumption), unit calculation and alcohol withdrawal management plans, indicators of alcohol dependency and the use and interpretation of the alcohol screening tools. The training was delivered by an international consultant supported by a national psychiatrist. Participants were encouraged to begin routinely screening their patients for alcohol problems.

## Outreach

One of the most affected villages by Haiyan on the outskirts of Tacloban City was chosen for outreach. The newly trained MASA staff were to administer alcohol

screening services during their usual health services under the supervision of the trainers. The clinic was open to the whole community.

## OUTCOME

### Assessment

The CAGE assessment of 239 people resulted in 31%, 56% and 13% of respondents being rated as having a low, medium or high risk of alcohol problems, respectively (Table 1). From the AUDIT, 22% (26 of 117) of respondents, six females and 20 males (8% and 47%, respectively), had a high risk and required some alcohol intervention (Table 1). Respondents were from 39 of the 138 villages in Tacloban City and were more likely to be members of the urban poor with little or no access to alcohol intervention services within their practical means.

The assessment of the knowledge and skills of local health staff regarding alcohol and safe and effective treatment options showed that they did not know how to approach a patient with suspicion of alcohol problems, and had no knowledge on the use of screening tools or on the relationship of alcohol to mental health. Overall, there was poor baseline knowledge by health staff on effective and safe treatment methods, which they attributed to the fact that such services were not provided. Health staff also showed a lack of knowledge regarding alcohol units and low-risk drinking levels and minimal baseline information on the specific harms of alcohol.

When local health workers were asked what they would do when faced with a person who had a problem with alcohol, the common response was that the patient would leave the clinic without any kind of treatment, advice or information.



## Training

Three separate training sessions were conducted for a total of 52 participants who included doctors, nurses, social workers and village health staff. The participants came from MASA, the City Social Welfare and Development Office and the DOH-Dulag, Leyte Treatment & Rehabilitation Center. Participants with a clinical background received more technical lectures.

## Outreach

The outreach clinic identified 20 people requiring alcohol services using the AUDIT. These patients were offered counselling, had safe reduction plans designed for them and follow-up support with referral to specialized care when needed. Feedback from those who agreed to undergo assessment revealed that they had not previously sought help and were unaware that help of any kind was available.

## LESSONS LEARNT

Many lessons were learnt from this pilot. We provided the first evidence that alcohol problems do exist in Tacloban City and that treatment for people with alcohol disorders, especially the poor, does not. Local health-care workers and other village staff were somewhat aware of the problems caused by alcohol but were ill-equipped to give appropriate and effective support to individuals who needed it. Patients who did recognize that they had a problem and wanted help reported they did not know where to seek it. This baseline situation was improved through our community-based programme, which was feasible to setup with minimal resources. Brief intervention and motivational interviewing through community visits and targeted client home visits provided a valuable initiative for supporting people with alcohol problems in the community.

We do not know if the level of alcohol use reported in this study is indicative of the level before Typhoon Haiyan or if it was an increase. The effect of disaster exposure on self-perceived changes in alcohol consumption has been observed, yet no significant association between disaster exposure and current alcohol use has been established.<sup>7</sup> We also do not know if the level is higher in Tacloban City than in the rest of Region 8. Regardless

of the applicability of the results to other settings, the levels of alcohol use in Tacloban City found by this study are concerning enough to need further public health intervention.

## DISCUSSION

Addressing alcohol-related issues in the community is a valuable public health intervention both post-disaster and in non-emergency times. The increased capacity of health professionals to assess and support people with alcohol problems can reduce alcohol-related harm. We have shown that community-based supportive services for alcohol were needed in Tacloban City and were achieved with minimal resources, including training on screening methods, designing alcohol reduction plans and building networks for specialized care. For this pilot, we only needed the commitment and willingness from local health staff; the continuation of the programme required no additional budget allowance. The assessment of patients for alcohol problems and subsequent treatment plans were integrated into the services already offered to the community by the local health nurses. Perhaps the main barriers were the lack of evidence demonstrating that problem drinking is indeed an issue in the local community and the lack of technical capacity to address problem drinking at the primary level.

There were several limitations to this pilot project. The initial assessment used convenience sampling, and the participation refusal rate was not recorded. There was no structured evaluation for the trained health professionals or the patients. However, informal feedback from two of the trained participants indicated they had increased their knowledge, confidence and ability to make a difference to those who are seeking help and are willing to change. Furthermore, local health authorities have verified the service implemented in this pilot has continued as part of the regular package of services with referral to specialized care when needed along with integration with the social service office. MASA has also incorporated the alcohol screening questions as part of their Healthy Lifestyle clinic day, which is held every Thursday. All identified high-risk patients are offered alcohol intervention support. Four months after the pilot, the programme had helped treat three alcohol-dependent people, and clients from this health programme are now automatically referred for livelihood support and other family improvement opportunities.

It is important that efforts are made to establish locally applicable, national-level, low risk drinking guidelines so the public and professionals are guided accordingly. There is also a need to conduct research on the impact of homemade spirits in the community. We recommend determining if the magnitude of alcohol problems in Tacloban City is the same elsewhere in the Philippines and institutionalizing community-based alcohol intervention programmes as well as developing local referral systems for alcohol intervention services.

### Conflicts of interest

None declared.

### Funding

None.

### Acknowledgements

We thank all the trainers, trainees and nurses that participated and continues to implement thos community-based alcohol intervention programme.

The authors would also like to thank the WHO Representative Office in the Philippines-Mental Health and Psychosocial Support Team, with special mention to Dr Katryn Beluso who supported the preparation and successful implementation of this pilot programme.

### References

- Cooper ML et al. Stress and alcohol use: moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology*, 1992, 101:139–152. doi:10.1037/0021-843X.101.1.139 pmid:1537960
- Room R, Babor T, Rehm J. Alcohol and public health. *Lancet*, 2005, 365:519–530. doi:10.1016/S0140-6736(05)70276-2 pmid:15705462
- Global status report on alcohol and health*. Geneva, World Health Organization, 2014 ([http://www.who.int/substance\\_abuse/publications/global\\_alcohol\\_report/en/](http://www.who.int/substance_abuse/publications/global_alcohol_report/en/), accessed 21 August 2015).
- Kishore V et al. Resource loss, coping, alcohol use, and posttraumatic stress symptoms among survivors of Hurricane Katrina: a cross-sectional study. *American Journal of Disaster Medicine*, 2008, 3:345–357. pmid:19202888
- North CS et al. Postdisaster course of alcohol use disorders in systematically studied survivors of 10 disasters. *Archives of General Psychiatry*, 2011, 68:173–180. doi:10.1001/archgenpsychiatry.2010.131 pmid:20921113
- Cerda M et al. Alcohol use trajectories among adults in an urban area after a disaster: evidence from a population-based cohort study. *Addiction (Abingdon, England)*, 2008, 103:1296–1307. doi:10.1111/j.1360-0443.2008.02247.x pmid:18855819
- Nordløyken A et al. Changes in alcohol consumption after a natural disaster: a study of Norwegian survivors after the 2004 Southeast Asia tsunami. *BMC Public Health*, 2013, 13:58. doi:10.1186/1471-2458-13-58 pmid:23336627
- Ad Standards Council for responsible advertising: guidebook*. Makati, Ad Standards Council, 2012 (<http://www.asc.com.ph/our-standards/code-of-ethics>, accessed 21 August 2015).
- McPherson M, Counahan M, Hall JL. Responding to Typhoon Haiyan in the Philippines. *Western Pacific Surveillance and Response Journal*, 2015, 6(Suppl 1):1–4. doi:10.5365/wpsar.2015.6.4.HYN\_026
- Tacloban: a fast rising highly urbanized city*. Tacloban City, National Statistical Coordination Board, 2013 ([http://www.nscb.gov.ph/ru8/Profiles/Municipal\\_Profile/Tacloban\\_City\\_Profile.pdf](http://www.nscb.gov.ph/ru8/Profiles/Municipal_Profile/Tacloban_City_Profile.pdf), accessed 21 August 2015).
- Manual of operations for drug abuse treatment and rehabilitation centers*. Manila, Dangerous Drugs Board, 2003 (<http://www.ddb.gov.ph/images/MANUAL%20OF%20OPERATIONS%20-%20DRUG%20REHAB.pdf>, accessed 21 August 2015).
- DOH accredited treatment and rehabilitation centers*. Manila, Dangerous Drugs Board, 2012 (<http://www.ddb.gov.ph/component/content/article/46-sidebar/65-doh-accredited-rehabilitation-centers>, accessed 21 August 2015).
- Senate Bill No. 2450: Philippine Mental Health Act of 2014*. Pasay City, 16th Congress of the Philippines, 2014 ([http://senate.gov.ph/lis/bill\\_res.aspx?congress=16&q=SBN-2450](http://senate.gov.ph/lis/bill_res.aspx?congress=16&q=SBN-2450), accessed 21 August 2015).
- Requirements on the application for the treatment and rehabilitation of drug dependents*. Manila, Dangerous Drugs Board, 2012 (<http://www.ddb.gov.ph/component/content/article/46-sidebar/64-treatment-and-rehabilitation>, accessed 21 August 2015).
- Benegal V, Chand PK, Obot IS. Packages of care for alcohol use disorders in low- and middle-income countries. *PLoS Medicine*, 2009, 6:e1000170. doi:10.1371/journal.pmed.1000170 pmid:19859536
- O'Brien CP. The CAGE questionnaire for detection of alcoholism: a remarkably useful but simple tool. *Journal of the American Medical Association*, 2008, 300:2054–2056. doi:10.1001/jama.2008.570 pmid:18984895
- Mental Health Gap Action Programme WHO*. Geneva, World Health Organization, 2008 ([http://www.who.int/mental\\_health/mhgap/en/](http://www.who.int/mental_health/mhgap/en/), accessed 21 August 2015).
- Babor TF et al., editors. *AUDIT: the Alcohol Use Disorders Identification Test – guidelines for use in primary care, Second Edition*. Geneva, World Health Organization, 2001 ([http://apps.who.int/iris/bitstream/10665/67205/1/WHO\\_MSD\\_MSB\\_01.6a.pdf](http://apps.who.int/iris/bitstream/10665/67205/1/WHO_MSD_MSB_01.6a.pdf), accessed 21 August 2015).
- Bohn MJ, Babor TF, Kranzler HR. The Alcohol Use Disorders Identification Test (AUDIT): validation of a screening instrument for use in medical settings. *Journal of Studies on Alcohol*, 1995, 56:423–432. doi:10.15288/jsa.1995.56.423 pmid:7674678
- Alcohol units*. London, National Health Service, 2015 (<http://www.nhs.uk/Livewell/alcohol/Pages/alcohol-units.aspx>, accessed 21 August 2015).





wpsar@wpro.who.int | [www.wpro.who.int/wpsar](http://www.wpro.who.int/wpsar)