REVIEW

The Vision Van, a Mobile Eye Clinic, Aids Relief Efforts in Tsunami-stricken Areas

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In the wake of the devastating earthquake and tsunami of March 11, our group at Keio University worked diligently to bring the Vision Van, a mobile eye clinic, from Miami, Florida, to disaster areas where medicines, eyeglasses, and indeed all other ophthalmological supplies and services, were nonexistent, thereby assisting many tsunami survivors suffering from eye problems. This act was encouraging not only to the patients and those working in the disaster-hit areas but also to ophthalmologists who wanted to use their medical specialty to assist those in need. (Keio J Med 61 (1) : 10–14, March 2012)

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The earthquake of March 11, 2011, hit the northeastern Pacific coast of Tohoku, Japan, triggering powerful tsunami waves that destroyed almost all coastal villages. Tragically, 15,842 people perished, nearly 5,900 were injured and 3,485 remained missing as of December 14.[1] Unlike the Hanshin earthquake of 1995, after which rescue missions were immediately underway and many were rescued from damaged buildings, following the March 2011 earthquake and tsunami, initial rescue attempts were delayed due to disabled communication networks and destroyed transportation systems. Rescue attempts were further complicated because the affected areas were far from metropolitan areas and it was not simply one city that was affected but almost all coastal villages and cities were destroyed. In addition to the challenges of the breakdown of communication networks, the lack of gasoline and supplies and the continuous aftershocks hampered rescue teams. The affected area was great, with no large cities nearby (**Fig. 1**). Sendai, the largest city in Miyagi Prefecture, itself was affected, and Morioka, the largest city in Iwate Prefecture, is far from the coastline and the roads were unusable.

A rapid rescue response is crucial, as was noted for the 2010 Haiti Earthquake.[2] However, after the March 11 earthquake, the tsunami was so powerful that municipal functions, including communications, were destroyed. Given the magnitude of the Great East Japan Earthquake, ophthalmic care was considered a relatively minor matter. Yet, the quality of life for survivors who lost their eyeglasses or required eye drops for eye care is an important issue. Many eyeglass shops and about 30 eye clinics were destroyed, as well as hospitals with ophthalmology departments. Miyagi and Iwate Prefectures in the northeastern part of Japan were the most affected regions in the tsunami zone. Several new public hospitals such as Rikuzentakata Hospital, Yamada Hospital, Shizugawa Hospital, Onagawa Hospital and Otsuchi Hospital in Iwate and Miyagi Prefectures were completely destroyed. Therefore, no eye care was provided in the tsunami-affected areas for the first 7–10 days.

Two weeks after the earthquake, we visited northeastern Japan to assess the situation and find ways to help the survivors with their ocular needs. At that time, we had limited means of providing assistance because a thorough eye exam requires bulky instrumentation. This was when we decided to bring the Vision Van, a mobile eye clinic, to Japan. Use of the Vision Van had been reported in the U.S. media when it was used after Hurricane Katrina in

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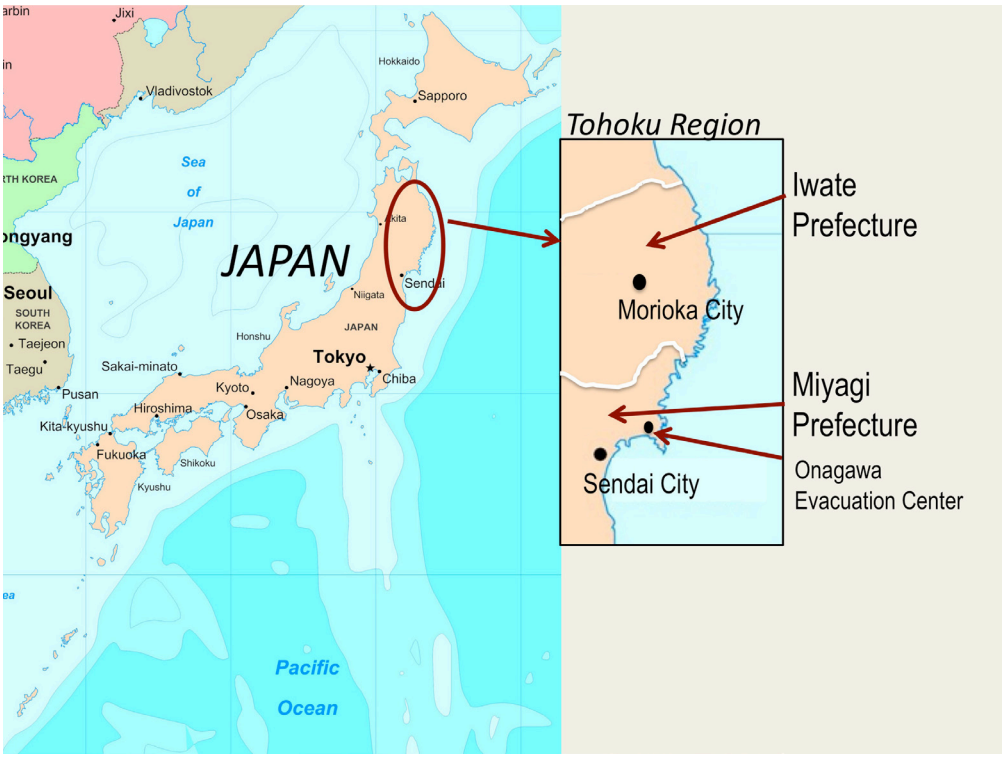

Fig. 1 Map of Japan with enlarged inset showing the affected Tohoku Region of northern Japan.

2005 to aid casualties with ocular problems.[3] The Vision Van is equipped with a slit lamp, funduscope, tonometer, and autorefractor as well as a satellite Internet connection and ample storage. We immediately contacted the Bascom Palmer Eye Institute to request the use of their Vision Van, and they were more than pleased to accommodate us. The next challenge was how to transport this large van, truly a bus, weighing nearly 26,000 pounds and 40 feet long from Miami to Japan. Various possibilities were explored with commercial airlines and the U.S. Air Force. Finally, the Japanese Cabinet obtained an offer of free transport from Volga-Dnepr Airlines to use their Antonov AN-124, the world's largest cargo airplane. Staff around the world worked quickly to prepare the paperwork and the Vision Van arrived at the newly opened Sendai Airport on April 14 (**Figs. 2, 3**). The following day, the van was in use (**Fig. 4**) and began its rotation of providing eye care to coastal cities in Miyagi and Iwate Prefectures, starting in the afternoon at Onagawa Evacuation Center. Even with short notice of the availability of eye care to the evacuees, 61 patients were treated that day alone (**Fig. 5**).

The Vision Van is equipped with all necessary equipment and ophthalmic supplies (**Fig. 6**); therefore, volunteer ophthalmologists can simply go to the care site and begin treating patients. The Vision Van rotated from the northern part of Iwate to Miyagi, visiting several towns on a weekly rotation, with Sundays off. We were able to provide eye care to these remote areas through the teamwork of Iwate and Tohoku Universities and the Japanese Ophthalmological Society.

On the Vision Van's first day of service in Japan, a 42-year-old woman was seen for blurred vision in the right eye. She was found to have diabetic retinopathy bleeding and was referred to Tohoku University Hospital for further treatment. Unfortunately, emergency food supplies that have a high glycemic index, such as rice balls and bread, contribute to many complications for patients suffering from diabetes. Without an appropriate eye exam, proper treatment such as photocoagulation or vitrectomy cannot be provided. Additionally, eye care to preserve vision and prevent further vision loss is crucial for those with chronic eye disorders such as diabetic retinopathy, glaucoma and age-related macular degeneration. Some patients were found to have elevated intraocular pressure, and appropriate eye drops were provided via the Vision Van. During the nearly 3 months of the Vision Van's rotation in Iwate and Miyagi Prefectures, 3389 patients were seen, averaging 55 patients per day. Overall, the major problems experienced by evacuees were lost or broken eyeglasses and the need for treatment for preexisting conditions, including cataract, conjunctivitis/allergy, contact lens replacement, glaucoma, dry eye/eye strain, diabetic retinopathy, and branch and central retinal vein

Fig. 2 The Vision Van is transported by Antonov AN-124 to Sendai − US and Russian collaboration makes it a true international rescue mission. Vision Van unloaded from the AN-124.

Fig. 3 Left to right: Kazuo Tsubota, Volga-Dnepr Airlines captain, Dr. Richard Lee (who traveled on the Antonov AN-124 from Miami to train volunteers how to use the Vision Van), and a Volga-Dnepr staff member.

Fig. 4 Vision Van on the first day of the rescue mission en route to Onagawa Evacuation Center.

Fig. 5 Patients waiting for a consultation with the ophthalmologist at Onagawa Evacuation Center.

Fig. 6 Inside view of the slit lamp on the Vision Van.

occlusions.

Although transporting the large, heavy Vision Van was difficult and expensive, through the goodwill and collaboration of many people, it was possible. The appearance of the Vision Van with its tropical designs on the exterior − especially a van all the way from Miami, Florida − was uplifting and gave a positive feeling to those who saw it.

Currently, discussions are underway for Japan to secure its own mobile eye-care van, as well as other vans that could be designed to address other medical needs. Even a ship offering medical services is being considered by the Japanese government. Future earthquakes, or other disasters such as typhoons, are inevitable, and emergency medical care should be prepared in advance. Mobile clinics such as the Vision Van provide valuable care to individuals displaced in the event of disasters, but they can also be used to provide services to those living in remote locations.

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