



JSPS



General Management Guide for Harmful Jellyfish Stings in the Western Pacific and Adjacent Areas



Editors

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BANGLADESH

INDONESIA

MALAYSIA

PHILIPPINES

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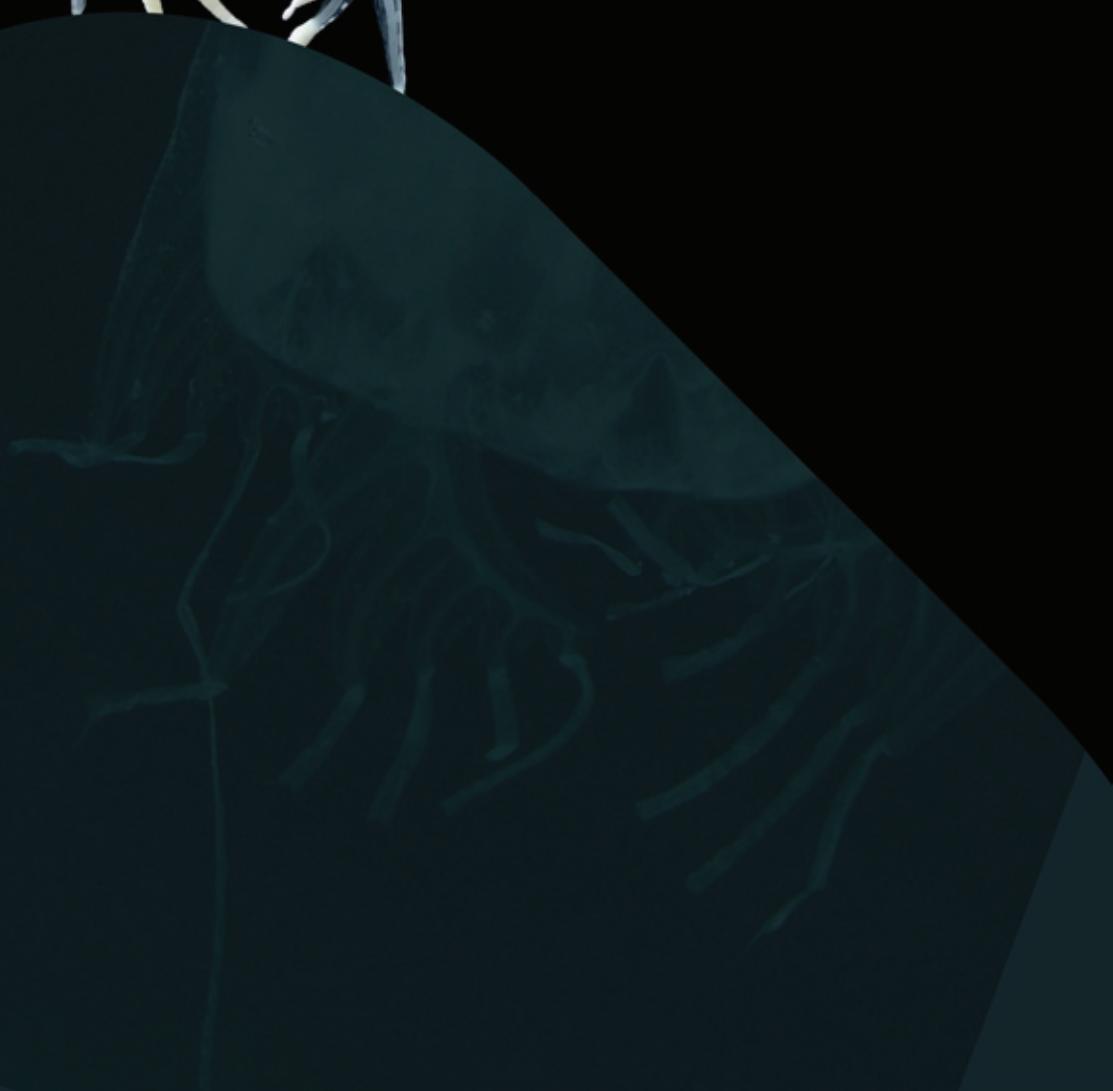
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FOREWORD I

WENXI ZHU

Head

IOC Sub-Commission for the
Western Pacific
UNESCO

Congratulations on this new publication, as practical knowledge about the occurrence of harmful jellyfish and first-aid practices for jellyfish stings in the Western Pacific. Once again, the importance to develop ocean knowledge and cooperation in safeguarding human and ocean health has been demonstrated.

The ocean in the region holds vast environmental, social, and economic significance, but is under the greatest threat in history as a result of climate change and human activities. Among them, an increase in the occurrence of jellyfish blooms, with their significant negative impacts on human health and ocean economy, has been reported globally and in the region.

Science's rightful place is in service of society. As part of the United Nations system, the UNESCO/IOC Sub-Commission for the Western Pacific (WESTPAC) spares no effort in catalyzing ocean science solutions to sustainable development. I am deeply grateful to Prof AILEEN TAN SHAU HWAI and the Centre for Marine and Coastal Studies (CEMACS), Universiti Sains Malaysia (USM) for the great support to, and a leading role in the Sub-Commission's activities addressing the issue of harmful jellyfish issue in the region. Leadership is also a partnership. I would acknowledge the meaningful partnerships that have been established among various research institutions, local communities, medical and emergency response teams, and relevant industries, since the beginning of this effort. Our sincere appreciation goes to one of our partners, JSPS, for its long-term support.



FOREWORD II

PROF. HIROAKI SAITO

Program Coordinator

JSPS Core-to Core Project CREPSUM

The University of Tokyo

Coastal society in the Western Pacific and Southeast Asia receive various services from marine ecosystems. Fish, shellfish, and seaweed are important nutritional sources for the people and also create unique culture in each region. Many tourists enjoy the beautiful scenery and creatures in the coral reef. Both fishery and tourism are important industries in this region.

Marine ecosystems are changing due to increasing human activities. Overfishing, eutrophication and coastal development change the ecosystem structure and productivity. Sustainable use of marine ecosystem services is an emerging issue for society. In 2019, scientists who share the sense of crisis about ecosystem degradation gathered at the University of Tokyo to discuss what they should clarify and how to disseminate the scientific knowledge to society. Based on the discussion, we started an international project Collaborative Research and Education Project in Southeast Asia for Sustainable Use of Marine Ecosystems (CREPSUM) in 2020 with the support from the Japan Society of the Promotion of Science (JSPS). One of the goals of CREPSUM is to contribute to UN Decade of Ocean Sciences and UN SDG 14 “Life below water” by preparing best scientific knowledge to society.

Jellyfish are an important ecosystem component which controls ecosystem dynamics including fish recruitment. Also, important fishery target organisms for the unique taste and texture. Jellyfish drifting in water may be a form of beauty that is calming to watch. Jellyfish are getting more popular in aquariums over the world. On the other hand, once harmful jellyfish appear, the beach is closed and fishermen get stung, this leads to human health hazards and economic loss. Considering the issue, a group of scientists of JSPS CREPSUM have been studying the biology and taxonomy of jellyfish, and also held on-line workshop for jellyfish identification, especially on the stings. One problem is that widespread belief in unscientific and inadequate methods of managing stings. The publication of a General Management Guide for Harmful Jellyfish Stings in the Western Pacific and Adjacent Areas is truly timely. This is an ideal product to solve social and human health issues by preparing adequate scientific knowledge and to contribute to the UN Ocean Decade. I acknowledge the serious efforts of the editors and authors for the publication of this book under the quite difficult condition of COVID-19 pandemic. I hope the book will be useful for people affected by harmful jellyfish in the Western Pacific.



FOREWORD III

PROF. DATO' DR.

AILEEN TAN SHAU HWAI FASc.

Principle Investigator of IOC-WESTPAC Project
Centre for Marine and Coastal Studies (CEMACS)
Universiti Sains Malaysia (USM)

Jellyfish blooms have been a threat to mankind over the decades. Jellyfish poses risks to human health and socioeconomic activities including severe stings, death, and the collapse of fisheries industries and aquatic systems. Jellyfish have provoked chaos in the Western Pacific and its adjacent areas (Bangladesh, Indonesia, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, and Vietnam) due to their notoriously painful and possibly fatal stings although the status of jellyfish invasion is still not a serious threat yet.

The scientists and medical teams are aware of the seriousness of the stings by jellyfish especially from venomous box jellyfish (cubozoans), yet not many people understand the exact first aid method to deal with jellyfish stings. Wrong diagnosis and treatment may cause complications and lead to casualties or deaths due to jellyfish venom. Therefore, prompt, and proper first aid will greatly increase the chances of survival. Thus, professional knowledge and experience from experts and emergency departments in various countries compiled into this guide book, which aims to disseminate the precise but simple first aid that can be applied by readers themselves during critical moments; also provides related beneficial information to the public.

The idea of the management and preventive guide for harmful jellyfish stings transpired during the 2nd WESTPAC workshop on harmful jellyfish in August 2019. A working group was created and the data from both scientific and medical perspectives was contributed by all 8 participating member countries (Bangladesh, Indonesia, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, and Vietnam).

Centre for Marine and Coastal Studies (CEMACS), Universiti Sains Malaysia, is the lead agency on this project and initiative, with scientific support from the Intergovernmental Oceanographic Commission of the Western Pacific (IOC-WESTPAC).

Contributing Authors and Institutions

This guide has been produced to assist in implementing the IOC-WESTPAC project entitled “Enhancement of Sustainable Harmful Jellyfish Research and Networking in Western Pacific Region”. This first aid guide is a joint effort by all member countries involved in the project. Below are the contributing authors of the guide:

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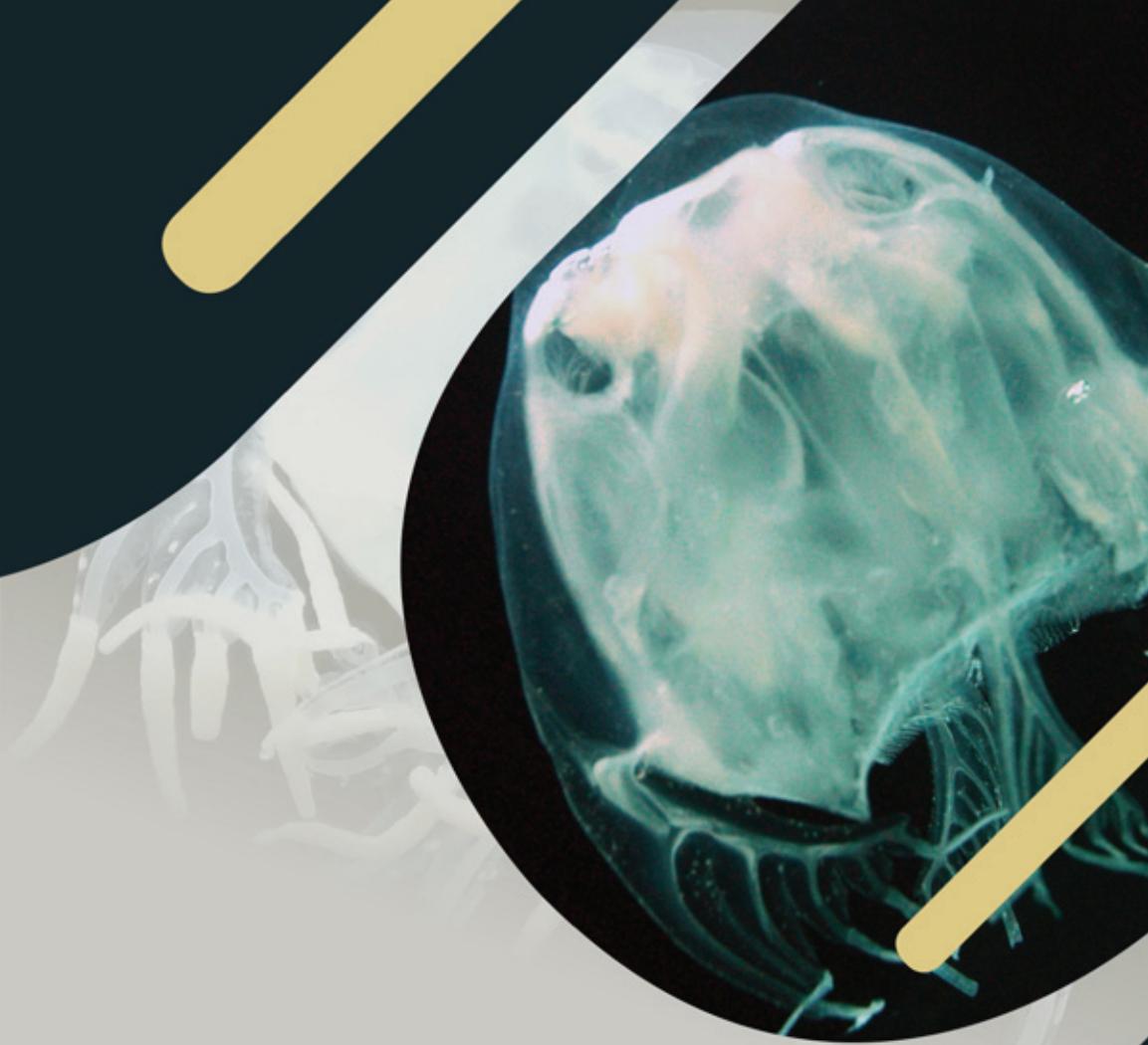
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CHAPTER 1
INTRODUCTION

Introduction

1.1 Importance of Jellyfish in the Environment

Jellyfish is one of the important groups of organisms with a gelatinous body. Generally, three groups of gelatinous zooplankton are referred to as jellyfish such as (1) medusae and siphonophores; (2) comb jellies; and (3) pelagic tunicates. The comb jellies are characterised by the presence of longitudinal plates of cilia along with their bodies. Globally, there are around 200 of comb jellies including bioluminescent species. Unlike the other jellies, pelagic tunicates have a dorsal nerve cord and currently around 150 species have been recorded worldwide. Both comb jellies and tunicates form blooms and are non-toxic.

With over 1,000 species of coelenterate jellyfish (medusae and siphonophores), they are evolutionarily close to corals and are called cnidarians due to the cnidocytes (stinging cells) located in their body. These stinging cells are highly specialised types of cells that can inject venom into prey and predators. Their stings are rarely fatal, but commonly cause short-term skin allergies and long-term injuries. Medusae are found in both fresh and marine waters, while comb jellies and pelagic tunicates dwell only in marine waters.

Cnidarian jellyfish are complex creatures, with a medusoid (bell-shaped) body form and tentacles, the nervous system of jellyfish have not been well studied. The class Scyphozoa, a group of ‘true’ jellyfish (scyphomedusae); the class Cubozoa, a group of ‘box’ jellyfish (cubomedusae); and the class Hydrozoa (hydromedusae and siphonophores) have been classified under the phylum Cnidaria. The bodies of these jellyfish consist of nearly 99% of water. Most feed on copepods, ichthyoplankton, and other small animals they catch using their stinging cell containing tentacles. Some, however, ingest suspension feed, extracting tiny animals from the water. Free-swimming cnidarian jellyfish occur in all oceans and are often found drifting along the shoreline. Most live for only a few weeks, but some are known to survive a year or longer.

There are about 240 scyphozoan species (Fig. 1A) under three orders, namely Coronatae, Rhizostomeae, and Semaeostomeae. Their body size range from 2 to 40 cm in diameter, however, some species are noticeably larger, with diameters of up to 200 cm. Most members of the class are vigorous swimmers, i.e., *Aurelia*, *Chrysaora*, and *Cyanea*. However, species of *Cassiopea*, the upside-down jellyfish, swim infrequently and sit inverted in shallow waters, exposing their photosynthetic symbiotic algae to sunlight. The life cycles of scyphozoans follow typically three stages. A sessile polyp (scyphistoma) stage asexually buds off young medusae from its upper end, with each such ephyra growing into an adult. Mature female jellyfish produce eggs, which are fertilised by the males. These eggs first develop into planula larva before transitioning into the polyp stage of development where they anchor to a substrate (i.e., rock surface). Then, the polyp grows into an ephyra (basically, a juvenile jellyfish) before reaching its adult medusa form.

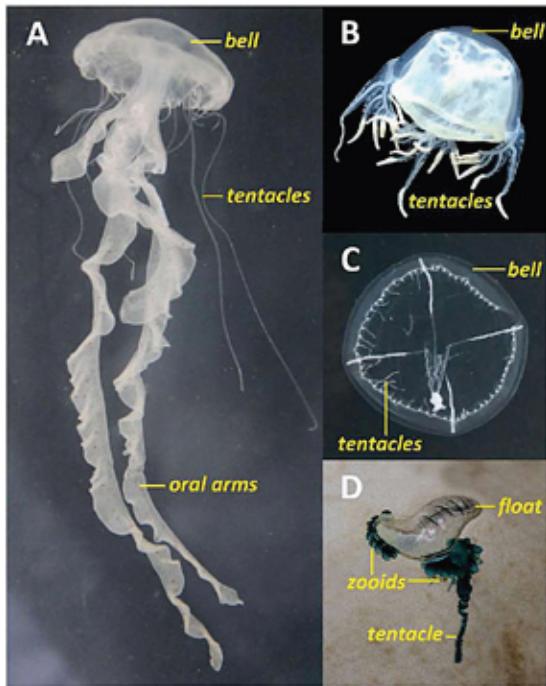


Fig. 1. Cnidarian jellyfishes (A–D): (A) a ‘true’ jellyfish / scyphomedusa; (B) a ‘box’ jellyfish / cubomedusa; (C) a hydromedusa, and (D) a siphonophore. Images by K.D. Karunaratne & M.D.S.T. de Croos

The class Cubozoa (Fig. 1B) comprises two orders, Carybdeida and Chirodropida. Together, both orders include about 50 known species. Most range from 2 to 4 cm bell height, although some reach a bell height of 25 cm. The genera *Chironex* and *Chiropsalmus*, generally called sea wasps, occur widely in the Indo-Pacific. Most of these forms are dangerously venomous; a moderate sting can cause death within a few minutes. Irukandji syndrome is one of the illness caused by box jellyfish. Unlike in the scyphomedusae, the polyp stage of box jellies produces only a single medusa. Polyps arise from a medusa or another polyp, through the process of budding. A single planula larva may produce various, genetically identical medusae.

Hydromedusae and siphonophores (Fig. 1C, D) are a diverse group, which comprise more than 800 species classified under six orders of Hydrozoa: Anthoathecata, Leptothecata, Limnomedusae, Narcomedusae, Siphonophorae, and Trachymedusae, found across the world. Most of them are smaller than 1 cm in size and transparent or lightly pigmented and live only a few days, thereby going mostly unnoticed by people. But some species are

easily visible, reaching a few centimetres and living for several months. They are often abundant in coastal habitats but are usually seasonal. Few species sting, although the few that do may be quite painful. Many of the hydromedusae are asexually budded off their single-sexed parent hydroids, which live attached to hard surfaces. Those hydroid colonies produce either male or female medusae, but not both sexes together. The female or male medusae then produce eggs and sperm, which are free spawned into the sea. The fertilised eggs develop into new hydroids, free-floating colonies known as siphonophores.

In general, jellyfishes have pros and cons for mankind. They are referred to as problematic because their blooms adversely affect coastal tourism, aquaculture, and fisheries all over the world (Purcell et al. 2007; Richardson et al. 2009). These worldwide impacts may result in untold millions of dollars in losses. Some jellyfish are reported to adversely impact ecosystems, which are difficult to quantify, such as indirect effects on fisheries's resources via predation of zooplankton (including ichthyoplankton) and as a vector for parasites or even being invasive species (Purcell et al. 2007; Richardson et al. 2009). Many scientists are reporting the increasing jellyfish population around the world are due to eutrophication (Malej et al. 2007), overfishing of predatory fish species (Mullon et al. 2005), the introduction of alien species (Graham & Bayha 2007), and climate change (Gibbons & Richardson 2008).

In contrast, these jellies are known to be ecologically and economically valuable groups. They are one of the main contributors to maintaining the balanced marine ecosystem by supporting nutrient cycling (Lebrato et al. 2012) and symbiotic associations (Purcell & Arai 2001). Moreover, jellyfish are a staple food for marine turtles and medusivorous fishes (Boero 2013). Further, jellies are one of the best bio-indicators used for environmental monitoring especially in detecting polluted waters (Templeman & Kingsford 2010). In addition, several species of jellyfish are exceptionally supported for various industries. Animal feeds derived from jellyfish have been used in livestock and aquaculture industries while fertilisers, weedicides, and insecticides made out of jellies are used in agriculture (Brotz & Pauly 2017). Highly expensive gelatine/emulsifier and bioactive compounds derived from jellies are used in the cosmetic (Cho et al. 2014) and pharmaceutical industries (Leone et al. 2015). In fisheries, jellies are used as baits (Karunaratne et al. 2021; Karunaratne & de Croos 2021) while in the field, as cement additives (Brotz & Pauly 2017). However, the use of jellyfish for such industrial purposes is still negligible compared to jellyfish harvest for direct human consumption. During the last couple of decades, global demand for edible jellyfish has bloomed, and the biggest jellyfish fishing nation is China followed by Thailand and India. In Asia, Vietnam, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, and South Korea are also engaged with the industry (Brotz & Pauly 2017). In addition, some countries in the American continent export processed jellyfish to the markets in Asia (Brotz & Pauly 2017). On the other hand, jellyfish are having increasing demand across the globe.

1.2 The Importance of First Aid Knowledge for Jellyfish Stings

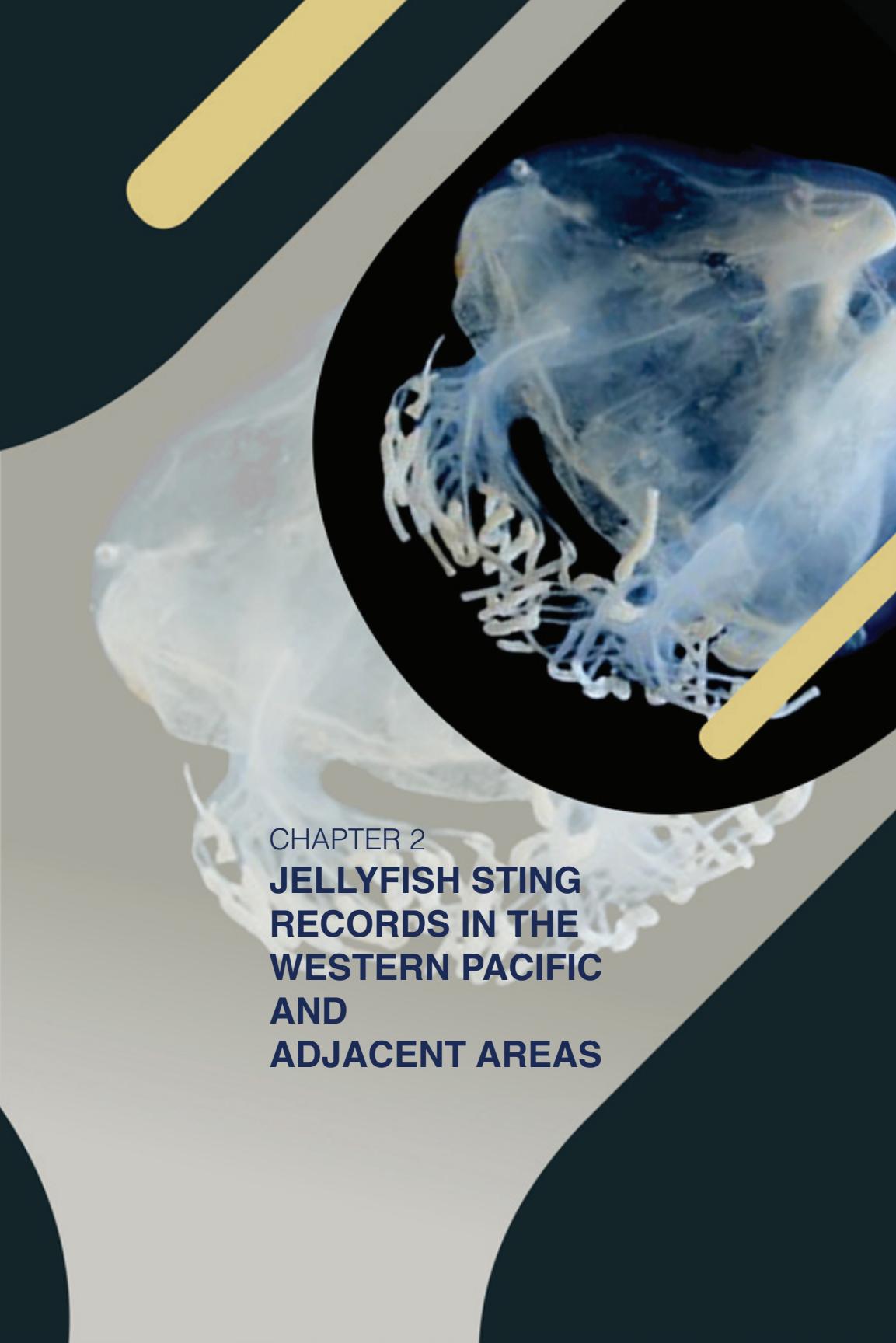
The Western Pacific region is surrounded by vast coastal areas. The region also hosts the most diverse marine flora and fauna and is also home to the best beaches in the world. Despite these innate characteristics, the risk of getting stung by jellyfish remains high. In fact, there are many under-reported incidences of jellyfish stings in the region. While there are cases of jellyfish stings reported in tourist area, the cases that occurred in remote coastal communities are under reported. Some of the jellyfish sting cases led to serious injuries and even death.

The risk of jellyfish stings in the region is higher compared to the rest of Asia. Despite the circumstance, there are no formal guidelines released on the management of jellyfish stings in the region, except for Thailand (Thaikruea & Siriarayaporn 2018; Thaikruea et al. 2020). Furthermore, the community also has no proper knowledge of first aid for these conditions particularly the coastal towns. Hence, this guide is made to provide proper guidance and knowledge to the community. Moreover, this includes safety measures and first aid of jellyfish stings as it aims to educate the public and encourage preventive measures to lessen the risk of jellyfish stings around the region.



Fig. 2. A harmful cubomedusa found in Marabut.
Image courtesy of Marvin Sarmiento.





CHAPTER 2

**JELLYFISH STING
RECORDS IN THE
WESTERN PACIFIC
AND
ADJACENT AREAS**

Jellyfish Sting Records in the Western Pacific and Adjacent Areas

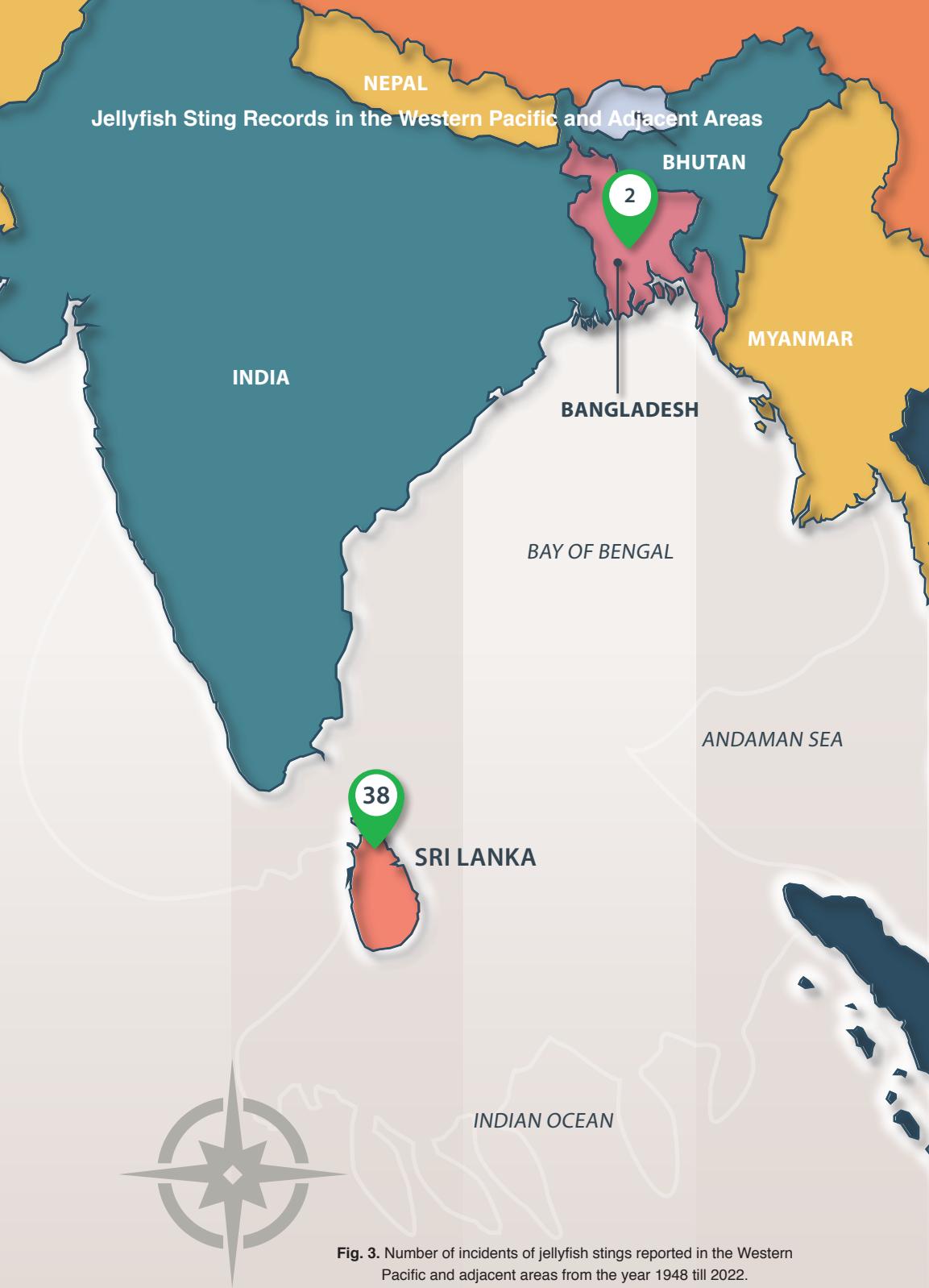


Fig. 3. Number of incidents of jellyfish stings reported in the Western Pacific and adjacent areas from the year 1948 till 2022.



Jellyfish stings are a frequent occurrence in many coastal regions across the Western Pacific and adjacent areas, with deaths and severe envenomation being reported over the years. Fig. 3 shows the overall number of cases recorded in the region from the year 1948 till 2022. However, the documented cases still do not represent the actual number of cases. There are still a lot of under-reported cases, especially in coastal communities. In most of these incidents, first aid was not properly given. Table 1 describes the incidents of jellyfish stings reported by countries in the Western Pacific and adjacent areas in detail which covers from the year 2000 to 2022, except for Sri Lanka, where the reporting started as early as year 1948.

Table 1. Incidents of jellyfish stings reported by countries in the Western Pacific and adjacent areas.

Country	Location	Date	Case	Species	Reference
Bangladesh	Kuakata, Patuakhali (Southwest Coast)	October 2020	A young male tourist felt sudden burning on his leg while swimming close to shore. As he came out of the water, tentacles of jellyfish were stuck in his hand. The victim received primary treatment from a local dispensary, but the irritation on his skin remained for several days.	Unknown	Personal communication
Teknaf, Cox's Bazar (Southeast Coast)	3 June 2013	A local fisherman aged 30 was hospitalised after being stung by an unknown jellyfish. Initially decontaminated by sea water, the victim was admitted to a local hospital with severe abdominal pain and intense burning on the contact side at left arm. The patient endured fever and cough, but gradually improved while treated conservatively with antihistamine, corticosteroids and antibiotics, and discharged from hospital on day 4.	Unknown	Uddin et al. (2014)	

Country	Location	Date	Case	Species	Reference
Indonesia	Pailus Beach, Jepara Regency, Central Java Province	July 2021	An 18-year-old boy died, got stung while catching fish with nets.	Unknown	Electronic newspaper report: Tribunnews.com
	Air Island, Batam, Riau Island Province	November 2020	An 5-year-old boy died, got stung on the stomach while playing on the water.	Unknown	Electronic newspaper report: Tribunnews.com
	Derawan Island, East Kalimantan	November 2020	An 6-year-old boy died, got stung while playing in the water.	Unknown	Electronic newspaper report: Tribunnews.com
	Sundak Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	12 July 2020	A tourist was reportedly stung by jellyfish.	<i>Physalia</i> <i>physalis</i> [as <i>Physalia</i> sp.]	Daily reports of 15 beach lifeguards* Primary Health Care Units reports near the beaches in the Special Region of Yogyakarta Province, Indonesia, in 2019-2020

Country	Location	Date	Case	Species	Reference
Indonesia	Pulangsawal Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	12 July 2020	2 tourists were reportedly stung by jellyfish.		Maharani & Widjastuti (2021)
	Baron Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	11 & 12 July 2020	4 tourists were reported stung by jellyfish.		Mulyadi & Sianturi (2021)
	Ngerenehan Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	05 & 11 July 2020	51 tourists were reported stung by jellyfish.		
	Kukup Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	26, 28, & 30 June, 01–12 July 2020	320 tourists were reported stung by jellyfish.		
		3–17 June, 6 July 2019	105 tourists were reported stung by jellyfish.		
	Indrayanti Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	7 & 16 June, 6 July 2019	18 tourists were reported stung by jellyfish.		

Country	Location	Date	Case	Species	Reference
Indonesia	Krakal Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	2, 11 & 12 July 2020	25 tourists were reported stung by jellyfish.		
	Drini Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	4, 15 & 16 June, 6 July 2019	37 tourists were reported stung by jellyfish. One of them was treated in the nearest primary health care unit on 6 July 2019.		
	Sepanjang Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	11 & 12 July 2020	10 tourists were reported stung by jellyfish.		
		3–5 & 7 June, 6 July 2019	34 tourists were reported stung by jellyfish.		
	Nguyahan Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	9–12 July 2020	95 tourists were reported stung by jellyfish.		
		3, 6, 7, 15 & 16 June, 6 July 2019	101 tourists were reported stung by jellyfish, 1 and 3 people were treated in the nearest primary health care unit on 15 June 2019 and 6 July 2019 respectively.		
		6 July 2019	5 tourists were reported stung by jellyfish.		

Country	Location	Date	Case	Species	Reference
Indonesia	Ngandong Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	16 June, 6 July 2019	7 tourists were reported stung by jellyfish.		
	Sadranan Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	15 & 16 June 2019	27 tourists were reported stung by jellyfish.		
	Gesing Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	5 July 2020	A tourist was reported stung by jellyfish.		
		15 & 16 June 2019	6 tourists were reported stung by jellyfish.		
	Parangtritis Beach, Bantul Regency, Special Region of Yogyakarta Province	3–12 & 14–17 June 2019	391 tourists were reported stung by jellyfish.		
	Depok Beach, Bantul, Regency, Special Region of Yogyakarta Province	4 & 14–15 June 2019	36 tourists were reported stung by jellyfish.		
	Watu Kodek Beach, Gunung Kidul Regency, Special Region of Yogyakarta Province	4 & 7 June 2019	6 tourists were reported stung by jellyfish.		

Country	Location	Date	Case	Species	Reference
Indonesia	Balekambang beach, Malang district, East Java Province	2018	13 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin	Unknown	Malangtimes.com
	Southern beaches of Purworejo district, Central Java Province	20 June 2018	10 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin, severe pain	Unknown	Tributanewsput orejo.com
	Southern beaches of Bantul district, Special Region of Yogyakarta Province	13 June – 03 July 2018	92 victims were reported stung by jellyfish. Symptom - Asphyxia, Itchy and burnt on skin, severe pain	<i>Physalia</i> <i>physalis</i> [as <i>Physalia</i> sp.]	Harianjogja.com
	Balekambang beach, Malang district, East Java Province	2017	10 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin, severe pain	Unknown	Malangpost.com
	Sepanjang beach, Bantul District, Special region of Yogyakarta Province	13 August 2017	20 victims were reported stung by jellyfish. Symptom - Asphyxia, stomach-ache, Itchy and burnt on skin	Unknown	Kbknews.id
	Tirtamaya beach, Indramayu district, West Java Province	22 September 2016	A number of national swimming athletes were reported stung by jellyfish. Symptom - Itchy and burnt on skin	Unknown	Bola.com

Country	Location	Date	Case	Species	Reference
Indonesia	Parangtritis beach, Bantul district, Special region of Yogyakarta Province	21 August 2016	5 victims were reported stung by jellyfish. Symptom - Asphyxia, Itchy and burnt on skin, Severe pain	Unknown	Viva.co.id
	Parangtritis beach, Bantul District, Special region of Yogyakarta Province	19 & 20 July 2015	378 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin, severe pain	Unknown	Viva.co.id
	Balekambang beach, Malang district, East Java Province	2014 – 2015	10 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin, severe pain	Unknown	Halo Malang
	Krakal, Sepanjang, Kukup beaches, Bantul District, Special region of Yogyakarta Province	17 August 2014	10 to 19 victims were reported stung by jellyfish. Symptom - Asphyxia, cramp, severe pain, nausea, shivering	<i>Physalia</i> <i>physalis</i> [as <i>Physalia</i> sp.]	Kabarhandayani. com
	Pangandaran beach, Ciamicit district, West Java Province	2 October 2009	1 victim was reported stung by jellyfish. Symptom - Almost unconscious	Unknown	PikiranRakyat 03/10/2009
	Kukup beach, Gunung Kidul, Special region of Yogyakarta Province	26 September 2009	64 victims were reported stung by jellyfish. Symptom - n/a	Unknown	Wulan, 2009

Country	Location	Date	Case	Species	Reference
Indonesia	Kukup beach, Gunung Kidul, Special region of Yogyakarta Province	26 September 2009	64 victims were reported stung by jellyfish. Symptom - n/a	Unknown	Wulan, 2009
	Widrapayung beach, Cilacap District, Central Java Province	22 September 2009	64 victims were reported stung by jellyfish. Symptom - Severe cold, choke	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Republikka 24/09/2009
	Parangtritis beach, Bantul District, Special region of Yogyakarta Province	22 September 2009	100 victims were reported stung by jellyfish. Symptom - Severe pain, unconscious	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Heru, 2009
	Parangtritis and Samas beach, Bantul District, Special region of Yogyakarta Province	19 July 2009	10 victims were reported stung by jellyfish. Symptom - Severe pain, unconscious	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Waskita, 2009
	Bembang beach, Bangka Island, Bangka Belitung Province	5 October 2008	An 4-year-old boy was reported stung by jellyfish. Symptom - Fatality	<i>Chrysaora</i> sp. [as <i>Chrysaora</i> <i>quinquecirrhata</i>]	Bangka Pos 07/10/2008
	Banyuputih beach, Situbondo District, East Java Province	4 July 2008	An 10-year-old boy was reported stung by jellyfish. Symptom - Fatality	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Radar Banyuwangi 05/07/2008

Country	Location	Date	Case	Species	Reference
Indonesia	Mlandingan beach, Situdomo District, East Java Province	5 June 2008	An 19-year-old male was reported stung by jellyfish. Symptom - Fatality	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Radar Banyuwangi 05/06/2008
	Parangtritis beach, Bantul	12 August 2007	10 victims were reported stung by jellyfish. Symptom - Itchy and burnt on skin	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Utantoro, 2007
	Teleng Ria beach, Pacitan	20 July 2007	10 victims were reported stung by jellyfish. Symptom - Severe cold, asphyxia	Unknown	Adi, 2007
	Depok beach	8 July 2007	2 (2009) and 50 (2004) victims were reported stung by jellyfish. Symptom - Stomach ache	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Werdjono, 2007
	Sanur Beach, Denpasar city, Bali Province	27 July 2005	Unknown Symptom - n/a	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Bali Pos 30 July 2005
Malaysia	Pulau Pangkor, Perak	August 2022	A 5-year-old French boy died after being stung by jellyfish at Teluk Nipah beach. Several sting marks were found on the victim's abdomen, left hand and on his left leg consistent with chirodripid box jellyfish sting marks.	<i>Chironex</i> sp.	Electronic newspaper report: The Rakyat Post

Country	Location	Date	Case	Species	Reference
Malaysia	Kota Kinabalu, Sabah	22 May 2022	An 7-year-old boy screaming in pain before collapsing after being stung by jellyfish. He was brought to hospital but pronounced dead.	<i>Chironex yamaguchi</i>	Forensic file Muhamad Na'im.
	Lahad Datu, Sabah	29 May 2021	An 8-year-old girl died after being stung by jellyfish at her house-water compound. Skin lesion consistent with chirodripid box jellyfish sting marks.	<i>Chironex yamaguchi</i>	Muhamad Na'im.
	Labuan, Sabah	6 March 2021	Two teenagers have been hospitalised after being stung by what could be box jellyfish while swimming at the popular Sungai Miri beach on Saturday morning. The boys were picnicking with their family at the beach before the incident happened at 11 am. The two were immediately rushed to Labuan Hospital for treatment and reported to be in stable condition.	Unknown box jellyfish	Electronic newspaper report: The Borneo Post
	Semporna, Sabah	13 August 2020	An 9-year-old boy was found floating near the water housing area with tentacle lash marks on body that were consistent with chirodripid box jellyfish sting.	<i>Chironex yamaguchi</i>	Remote Envenomation Consultancy Services (RECS) Muhamad Na'im
	Labuan, Sabah	9 March 2020	An 9-year-old boy, a tourist, was brought to the Emergency Department because of severe pain after being stung by jellyfish. Family members manage to capture the image of the jellyfish.	<i>Physalia physalis</i> [as <i>Physalia</i> sp.]	RECS Muhamad Na'im

Country	Location	Date	Case	Species	Reference
Malaysia	Kota Belud, Sabah.	24 December 2019	An 7-year-old girl died after being stung by jellyfish. Skin lesion consistent with chirodripid box jellyfish sting marks	<i>Chironex yamaguchi</i>	RECS
	Tanjung Rhu, Langkawi	28 June 2018	A Swedish tourist died near the Tanjung Rhu beach after being stung by a jellyfish. Sohrabi Saeed, 60, was swimming near the beach in the northern part of the island when he is believed to have been stung at 3.15 pm.	Unknown	Electronic newspaper report: New Straits Times
	Tanjung Aru beach, Kota Kinabalu	30 July 2017	Five children enjoying a day at the beach were stung by jellyfish in two separate incidents at the Tanjung Aru beach here today. The first incident at 12.30pm involved two children, aged 5 and 8, who were in agony after being stung while in the water. Three civil defence personnel who were stationed at the beach's rescue tower responded to the emergency after being alerted by family members.	Unknown	Electronic newspaper report: New Straits Times
	Teluk Bahang, Penang	7 March 2017	An 12-year-old school boy fell into a coma for three days after being stung by a jellyfish while swimming in Teluk Bahang. Ahmad Azfar Hakim, 12, was in pain for over a week before falling into a coma on Thursday after he was admitted to the Seberang Jaya Hospital.	Unknown	Electronic newspaper report: The Star

Country	Location	Date	Case	Species	Reference
Malaysia	Kota Belud, Sabah	31 December 2022	An 4-year-old Japanese boy died after being stung by a chirodripid box jellyfish.	Unknown (most probably box jellyfish)	Electronic newspaper report: The Star
	Pantai Cenang, Langkawi	February 2010	An 45-year-old Swedish female tourist died after being stung by a jellyfish while taking an evening swim off a beach in Langkawi. She suddenly shrieked with pain and became unconscious within seconds. Lesions, reportedly consistent with a chirodripid sting, were visible on her legs.	Unknown (most probably box jellyfish)	Electronic newspaper report: Phuket Wan
	Kota Kinabalu, Sabah	November 2006	An 8-year-old South Korean girl was reported to have died after a jellyfish sting at Pulau Sapi, near Kota Kinabalu, Sabah. She had lesions on both legs and collapsed within seconds and died shortly thereafter. The lesions described were consistent with chirodripid sting.	Chirodripid box jellyfish	Forensic case note Electronic newspaper report: Daily Express
			Another child was stung at Pulau Sapi 1 month later and the lesion showed a pattern, typical of a multi-tentacled box jellyfish, indicating that chirodripid jellyfish occur in the area.		

Country	Location	Date	Case	Species	Reference
Malaysia	Pulau Pangkor, Perak	June 2000	An 26-year-old male tourist from Brunei reportedly died after a jellyfish sting at Pulau Pangkor. He and several friends were stung and he collapsed and died on the way to hospital. The death was reported to be from an "anaphylactic reaction" to the sting.	Unknown	Electronic newspaper report: New Straits Times
Philippines	V. Sagun, Zamboanga del Sur	July 2021	A Grade 6 female pupil was stung with "salabay" on her body during swimming with her brother which led to her demise. The brother was also stung on the shoulder and was rushed to the hospital	Unknown box jellyfish	Facebook Post (Jhoanne Toyco)
	Tabuelan, Cebu	July 2021	A case of an adult male having severe pain and difficulty breathing after getting stung by unidentified jellyfish while swimming. Vinegar and coconut cream/milk was immediately used to treat the affected leg. Victim reported that his difficulty in breathing subsided after an hour. He did not visit any clinic or hospital and managed the symptoms with sunflower oil and hot compress as home remedies.	Unknown	Private correspondent w/ author; Unreported and unpublished
	Tuburan, Cebu	June 2021	An 11-year-old boy was stung mid-day while swimming with his brother in a public beach. According to a bystander, the boy's face, neck and arms were swollen by the sting. He was immediately rushed to the district hospital. The boy made a recovery.	Unknown box jellyfish	Electronic News: Cebu Daily News

Country	Location	Date	Case	Species	Reference
Philippines	Del Gallego, Camarines Sur	June 2021	An 7-year-old girl was stung together with her uncle and cousin in a Beach Resort while swimming in the afternoon. The girl was rushed to the hospital but was declared dead upon arrival. The uncle and cousin's condition remained unreported.	Unknown box jellyfish	Electronic News: GMA News Online
	Capul-an, Capoocan, Leyte	June 2021	An 4-year-old male together with 34-year-old father, was swimming early in the morning. Father saw the box jellyfish and tried to save son, however both were stung. Both was rushed to the hospital for treatment	Unknown box jellyfish	Facebook Post (Xymarth Peguira)
Camarines		May 2021	An 5-year-old daughter of a fisherman was stung while his father was fixing his net. The child was brought to the local hospital in Tinambac but did not survive.	Unknown box jellyfish	Electronic Post in Facebook: 103.1 Brigada News FM Naga, Camarines Sur
	Port Barton, Palawan	April 2021	An adult Caucasian male got stung by unidentified box jellyfish on his lower abdomen and left arm. Victim reported pain on the affected extremity and was immediately treated with vinegar by the locals. He was brought to the nearby clinic for some medicines/antibiotics and later discharged.	Unknown box jellyfish	Youtube: Brennybrez

Country	Location	Date	Case	Species	Reference
Philippines	Hinoba-an, Negros Occidental (Nabulao Beach Resort and Spa)	8 February 2021	An 2-year-old girl playing near the shore, stingers were removed, poured cold orange juice, and poured vinegar thereafter. Victim was pale and unconscious, and was brought to the hospital	Unknown box jellyfish	Facebook Post: (Ma Zita Vanessa Dequita - Jarme)
	Puerto Princesa, Palawan	June 2020	A man was stung during swimming on the beach	Unknown box jellyfish	Facebook Post (Eduardo Nitro Jr.)
	Tulaan, Babatngon, Leyte	30 September 2019	A man brought in due to jellyfish sting. He complained of severe pain on the location of the stings. He was admitted and eventually discharged.	Unknown	Department of Emergency Medicine (DEM), Eastern Visayas Regional Medical Center (EVRMC)
	Bacubac, Basey, Samar	19 August 2019	An 21-year-old woman pregnant swam in the beach when she was stung by an unknown jellyfish. She was in severe pain and was transported to EVRMC. She had lost consciousness upon arrival at the emergency department and was resuscitated. Emergency perimortem caesarean section was done. She was revived and the baby was successfully delivered; however, both died within 24 hours of hospital stay.	Unknown box jellyfish	DEM EVRMC Case report, unpublished

Country	Location	Date	Case	Species	Reference
Philippines	Hilotongan Channel, Cebu & Samar, Leyte	May & July 2019	A reported case of an outbreak of Thimble jellyfish off the coast of Lapu-Lapu City, where several beach-goers and boaters were severely stung. Due to the massive bloom, some resorts and dive shops were forced to close during the event. The same species was also present in another island in Samar, Leyte 2 months after the incident in Cebu	<i>Linuche</i> sp. [as <i>Linuche unguiculata</i>]	Electronic News: Cebu Daily News
Pangasinan		April 2019	Provincial government of Pangasinan reported several jellyfish stings during the month of Lent where a lot of people would crowd in beaches. Most of the cases were mild and treated immediately but a few of the victims were rushed to the hospital due to difficulty in breathing.	Unknown	Electronic News: Philippines News Agency
Caramoan, Camarines Sur		August 2018	A half Italian-Filipino 7-year-old girl was stung during an island hopping vacation by what was identified by the boatmen as a box jellyfish. The mother tried to remove all the tentacles and observed that her child's leg was already turning purple. It took 2 hrs. for the child to be brought to the hospital where she died upon arrival.	Unknown box jellyfish	Electronic News: ABS-CBN News

Country	Location	Date	Case	Species	Reference
Philippines	Bantayan Island, Cebu	July 2018	A case of a local female traveller who got stung by unknown box jellyfish, identified by local lifeguards. Was immediately treated with vinegar and strings removed barehanded by the lifeguards. Hours after the incident, the victim reported of numbness around the affected arm all the way to her shoulders. Victim did not visit the hospital for any treatment and managed on her own.	Unknown box jellyfish	Youtube: Jeremy Kruis
	Dahilican Beach, Quezon Province	June 2018	An 1-year-old boy died after being stung by an unknown jellyfish near the shore while on a family vacation. The child died on route to the hospital.	Unknown box jellyfish	Electronic & Facebook Post: The Summit Express via Rosemae Tomilloso Alegre (Facebook)
	B. Bacong, Babatngon Leyte	26 April 2018	An 8-year-old male swam in the shores of Babatngon around 8am in the morning. He was stung by a jellyfish and was brought to EVRM. Vinegar was applied to the sting however the tentacles were not removed from the patient's extremities. Upon arrival at the emergency department, he was initially agitated and eventually went into cardiac arrest.	Unknown box jellyfish	DEM EVRM Case report, unpublished

Country	Location	Date	Case	Species	Reference
Philippines	Tagkawayan, Quezon Province	May 2015	An 11-year-old boy died after being stung in the neck while swimming with his friends near their coastal village home.	Unknown	Electronic News: GMA News Online
San Juan, Batangas		April 2014	Philippines's local actress was stung during a taping of a local television series on the beach. The actress was reported to have "super rashes all over her body" and was rushed to the local hospital for treatment. She made a full recovery after the incident.	Unknown	Electronic News: Rappler.com
Tondaligan Beach, Pangasinan		April 2014	News Reported a minor case of a 13-year-old girl stung while swimming in their local waters. The local government also issued a warning about beach goers being careful in the water while swimming.	Unknown	Electronic News: Inquirer.com
Malalang, Davao del Sur		January 2014	An 8-year-old boy was stung after swimming in the afternoon in a local resort. The child reported rashes and severe pain in the affected area and was rushed to the hospital. He was pronounced dead upon arriving at the hospital. Doctors reported his death as a result of complications by the jellyfish toxin.	Unknown box jellyfish	Electronic News: Inquirer.com

Country	Location	Date	Case	Species	Reference
Singapore	Singapore, Punggol	19 Jun 2021	A 3-year-old child was stung on abdomen, hands and legs while swimming on the beach and was rushed to the hospital. Child was hospitalised for at least five days. Swelling and blistering were reported. Obvious ladder-like stinging pattern was observed.	Unknown (possibly box jellyfish)	Anecdote
Sri Lanka	Near Galle Fort (southern Sri Lanka)	July 2018	A 10-year-old boy developed an anaphylaxis due to a jellyfish sting after bathing in the sea. He experienced a sudden onset of localised pain over the medial surface of the right forearm. Immediately after, he experienced a tightening of the chest and difficulty in breathing, abdominal cramps and pain in both armpits. He had mild dyspnea, strider, and blackish skin lesions resembling burn marks over contact sites with mild swelling. The patient did not complain of any significant event afterwards and the skin lesions turned into light patches at two weeks.	Unknown (possibly box jellyfish)	Case report: Ruben et al. (2018)
Jaffna District (northern Sri Lanka)		October 2017	A fisherman died before hospitalisation (5 to 10 people die annually in northern Sri Lanka due to jellyfish envenomation).	Unknown	Case report: Ruben et al. (2018)
Pohena Beach, Matara (southern Sri Lanka)		June 2015	Five bathers including a foreign child were admitted to the Matara General Hospital.	<i>Physalia physalis</i>	Newspaper report: Lankadeepa (2015)

Country	Location	Date	Case	Species	Reference
Sri Lanka	Ambalangoda Beach (southern Sri Lanka)	June 2015	Seven bathers (age 16 to 43) stung were admitted to the Matara General Hospital. Most of the patients had the clinical signs of local pain, irritation, swelling, vertigo, chest pain and shortness of breath. Two patients were left against medical advice on the same day and the rest were discharged on the following day.	<i>Physalia physalis</i>	Personal communication: Dr Samantha Liyanage
	Polhena, Matara (southern Sri Lanka); Mt Lavinia (western Sri Lanka)	June 2015	Several persons were hospitalised after a jellyfish envenomation. Jellyfish attacks developed pains, itching, and rashes, while those who developed severe allergies were taken to Kalubowila Hospital for treatment.	<i>Physalia physalis</i> [as <i>Physalia utriculus</i>]	Electronic newspaper report: The Sunday Times (2015)
	Western and southern Sri Lanka	June 2015	About 35 persons engaged in sea bath were hospitalised as a result of body contact with jellyfish.	Unknown (mostly <i>Physalia physalis</i>)	Electronic newspaper report: Hiru News (2015)
	Galle Face (western Sri Lanka)	June 2015	Four children who were wading in the sea were stung and immediately hospitalised.	<i>Physalia physalis</i>	Electronic newspaper report: Dailymirror (2015a)

Country	Location	Date	Case	Species	Reference
Sri Lanka	Mount Lavinia (western Sri Lanka); Polhena Beach, Ambalangoda and Tangalle (southern Sri Lanka)	June 2015	A few cases were reported. Painful stings, red welts and inflammation together with nausea and dizziness (hypersensitive people may experience low blood pressure, breathing difficulties and develop an allergic reaction). All patients admitted were discharged with treatments soon.	<i>Physalia physalis</i>	Electronic newspaper report: Dailymirror (2015a)
	Polhena Beach, Matara (southern Sri Lanka)	June 2015	Four people with jellyfish floating on the water were hospitalised. Symptoms were painful stings, red welts and inflammation together with nausea and dizziness. Patients were discharged with treatments soon.	Jellyfish unreported (mostly <i>Physalia physalis</i>)	Electronic newspaper report: Dailymirror (2015b)
	Mount Lavinia and Dehiwala (western Sri Lanka); Polhena Beach, Matara (southern Sri Lanka)	June 2015	Several incidents of people being stung by jellyfish and hospitalised were reported.	Unknown (mostly <i>Physalia physalis</i>)	Electronic news reports: News 1 st (2015a, b)
	Moratuwa and Beruwela (western Sri Lanka); Bentota (southern Sri Lanka)	June 2015	Snorkelers, fishermen, and tourists were reported to have suffered from stings.	<i>Physalia physalis</i> [as <i>Physalia</i> sp.]	Press statement: NARA (2015)

Country	Location	Date	Case	Species	Reference
Sri Lanka	Moratuwa (western Sri Lanka)	June 2015	A fatality was reported at the Kalubowila Hospital.	<i>Physalia physalis</i> [as unidentified sea creature]	Press statement: NARA (2015)
	Polhena Beach, Matara (southern Sri Lanka)	1999–2015	Several people including foreign tourists were stung and treated with traditional medicine.	<i>Physalia physalis</i> and some other species	Newspaper report: Divaina (2015)
	Around Jaffna (northern Sri Lanka)	March 2014 to February 2015	Some fishermen with jellyfish stings were admitted to the Teaching Hospital, Jaffna.	<i>Lobonemoides</i> sp. [as moon jellyfish]	Journal article: Sujanitha et al. (2017)
	Around Jaffna (northern Sri Lanka)	March 2014 to February 2015	Some fishermen with jellyfish stings were admitted to the Teaching Hospital, Jaffna.	<i>Cyanea</i> sp. [as <i>Cyanea capillata</i>]	Journal article: Sujanitha et al. (2017)
	Around Jaffna (northern Sri Lanka)	March 2014 to February 2015	Some fishermen with jellyfish stings were admitted to the Teaching Hospital, Jaffna.	<i>Crambionella</i> sp. [as <i>Catostylus mosaicus</i>]	Journal article: Sujanitha et al. (2017)
	Jaffna District (northern Sri Lanka)	2014	Thirty-four victims were admitted to the Karainagar and Point Pedro Hospitals.	Unknown	Personal communication: Dr Samantha Liyanage

Country	Location	Date	Case	Species	Reference
Sri Lanka	Kalpitiya (western Sri Lanka)	2014	Nine victims were admitted to the Kalpitiya Hospital.	Unknown	Personal communication: Dr Samantha Liyanage
	Colombo (western Sri Lanka)	2014	Ten victims were admitted to the Panadura and Kalubowila Hospitals.	Unknown	Personal communication: Dr Samantha Liyanage
	Mount Lavinia, Kalutara and Beruwela (western Sri Lanka)	2012	Several incidents were reported (note: the species has been observed during the monsoon in the southern and western coast since the 1980s).	<i>Physalia physalis</i>	Electronic newspaper report: Daily mirror (2015a)
	Jaffna District (northern Sri Lanka)	Unknown	The Irukandji syndrome due to box jellyfish envenomation.	Unknown	Personal communication: Dr Samantha Liyanage
	One of the Jaffna islands (northern Sri Lanka)	Unknown	Irukandji syndrome occurred in a bather following jellyfish envenomation.	Unknown (possibly box jellyfish)	Case report: Ambalavaranar (2004?)

Country	Location	Date	Case	Species	Reference
Sri Lanka	Wellawatte (western Sri Lanka)	August 1996	A person was stung on the back of the hand, leaving linear, pigmented marks that were still faintly visible three months later. Another was badly stung on his forearm, resulting in confluent weals that covered the greater part of the forearm and the back of the hand. The pain of a sting developed slowly and erythematous weals appeared rapidly. Within 30 mins the pain was replaced by pruritus and both weals and pruritus were waning at one hour. It took 36 to 48 hours for both to resolve.	<i>Chiropsoides buitendjiki</i> [as <i>Chiropsalmus buitendjik</i>]	Journal article: Fernando (2001)
	Mount Lavinia (western Sri Lanka)	August 1996	Several divers were stung. The stings caused pain, not as intense as the pain caused by Chrysaora and Physalia. Red weals appeared rapidly. At the end of one hour, the weals had partly subsided and the itching, which had replaced the pain was less. However, neither nor itch had completely subsided 24 hours later.	<i>Chiropsoides buitendjiki</i>	Personal notes: Dr Malik Fernando
	Mount Lavinia (western Sri Lanka)	January 1996	Personal experience of a diver, a sting during scuba diving on the reef.	<i>Chrysaora</i> sp.	Personal notes: Dr Malik Fernando

Country	Location	Date	Case	Species	Reference
Sri Lanka	Wellawatte (western Sri Lanka)	December 1994	Personal experience of stings on exposed parts of the body, as well as on covered parts while diving.	<i>Eutima</i> sp.	Personal notes: Dr Malik Fernando
	Wellawatte (western Sri Lanka)	December 1994	Swimmers and divers were stung mildly (uncomfortable stings).	<i>Timoides</i> sp.	Personal notes: Dr Malik Fernando
	Mount Lavinia (western Sri Lanka)	May 1994	Personal experience of a diver, a sting on his left forearm.	<i>Pelagia</i> sp.	Personal notes: Dr Malik Fernando
	Mount Lavinia (western Sri Lanka)	September 1993	A diver was stung. Red weal, which was present one hour later. Sting pain lasted a short time only.	Presumed <i>Chrysaora</i> sp.	Personal notes: Dr Malik Fernando
	Mount Lavinia (western Sri Lanka)	June 1993	Personally, experienced a sting on the chin and fingers. The pain took 1-3 mins to develop. The pain reached a peak in 10-15 mins and subsided in 1 hour. No observable weal.	<i>Physalia physalis</i>	Personal notes: Dr Malik Fernando
	Mount Lavinia (western Sri Lanka)	August 1992	A foreign female was stung, but that she had not been unduly troubled.	<i>Cyanea</i> sp.	Personal notes: Dr Malik Fernando
	Wellawatte (western Sri Lanka)	May 1992	A person was stung as mild. An erythematous weal formed within 10 min, reaching its maximum size after 30 min, and fading thereafter. The pain subsides in about 30 min.	<i>Chrysaora</i> sp. [as <i>Chrysaora quinquecirrha</i>]	Journal articles: Fernando (1994, 2001); Personal notes: Dr Malik Fernando

Country	Location	Date	Case	Species	Reference
Sri Lanka	Wellawatte (western Sri Lanka)	May 1992	A person was stung on the base of his neck by mouth arms. No weals raised, unlike tentacle stings.	Presumed <i>Chrysaora</i> sp.	Personal notes: Dr Malik Fernando
Wellawatte (western Sri Lanka)		April 1992	Many bathers and 6-mile race swimmers were being severely upset by stings. Contact with tentacles results in shrimp, instantaneous pain. The stinging sensation lasted nearly 30 mins. No obvious weals seen.	<i>Chrysaora</i> sp. [as <i>Chrysaora quinquecirrha</i>]	Journal articles: Fernando (1994, 2001); Personal notes: Dr Malik Fernando
Dehiwala/Mount Lavinia (western Sri Lanka)		October 1990	Inadvertent sting on the left forearm while scuba diving. Sharp, mild stinging pain with weal. Signs and symptoms cleared rapidly.	<i>Chiropsoides buitendjiki</i>	Personal notes: Dr Malik Fernando
Off Colombo (western Sri Lanka)		July to October (year unknown)	Spearfishing divers were stung mildly. One sting on the forearm produced rows of erythematous papules 2 mm across spaced 6 mm apart. The pain subsided over 30 to 60 minutes (but may persist for a few hours if sensitive areas such as lips are stung). Erythema subsided over about 3 hours, the weals taking a few days to resolve completely, during which time they were mildly pruritic.	<i>Cyanea</i> sp. [as <i>Cyanea purpurea</i>]	Articles: Fernando (1991, 1992, 2001)
Mount Lavinia and Wellawatte (western Sri Lanka)		June and July (year unknown)	Spearfishing divers and sea bathers were stung. Some stings were extremely painful and caused a lot of distress, but all symptoms and signs resolved in 24 hours.	<i>Physalia physalis</i> [as <i>Physalia</i> sp.]	Journal articles: Fernando (1991, 1992, 1994, 2001)

Country	Location	Date	Case	Species	Reference
Sri Lanka	Trincomalee (eastern Sri Lanka)	February 1948	A British woman aged 27 was reported with pain, skin discolouration and localized fat atrophy after a jellyfish sting.	Unknown	Case report: Gunn (1949)
Thailand	Phangan Island Surat Thani Province	9 October 2022	An 6-year-old Israeli girl developed post cardiac arrest after a jellyfish sting.	Box jellyfish	Suratthani Hospital
	Phangan Island Surat Thani Province	28 August 2021	An 9-year-old Israeli boy, severely injured and then died after a jellyfish sting.	Probably box jellyfish	Division of Epidemiology, Thailand
	Laem Son Beach, Rayong Province	2 July 2020	A fisherman, 48-year-old, died.	Unknown, probably box jellyfish or Sea Nettle/fire jellyfish (in Thailand)	Division of Epidemiology, Thailand
	Thung Wua Laen Beach, Chumphorn Province	2020	A Thai woman, 50-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	12 November 2019	Three persons, severe injury after a jellyfish stings.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Lanta Island, Krabi Province	2017	A male tourist from France, 69-year-old, severely injured with cardiac arrest (but, finally survived) after a jellyfish sting.	Unknown box jellyfish	Ramathibodi Poison Center

Country	Location	Date	Case	Species	Reference
Thailand	Phangan Island, Surat Thani Province	2017	A male tourist from the Netherlands, 21-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2017	A male tourist from China, 55-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Phangan Island, Surat Thani Province	2017	A Thai woman, 31-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Kood Island, Trat Province	2017	An 52-year-old, severe injury after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Lanta Island, Krabi Province	2017	A male tourist from Australia, 11-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Lanta Island, Krabi Province	2017	A male tourist from France, 68-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Lanta Island, Krabi Province	2017	A Thai male tourist, 14-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand

Country	Location	Date	Case	Species	Reference
Thailand	Cha-am Beach, Phetchaburi Province	2016	A female tourist from Finland, 48-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2016	A male tourist from England, 15-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2016	A tourist girl from France, 7-year-old, was severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	17 September 2016	A tourist boy from Russia, 2-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2016	A Burmese, 30-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2016	A female tourist from Italy, 42-year-old, suffered severe injury after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2016	A female tourist from Russia, 17-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Aonang, Krabi Province	2016	A Thai tourist boy, 11-year-old, was severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand

Country	Location	Date	Case	Species	Reference
Thailand	Adang-Rawi Islands, Satun Province (nearby area)	18 October 2015	A Thai fisherman, 31-year-old, died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	06 October 2015	A female tourist from Germany, 20-year-old, died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2015	A Thai female tourist, 23-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	12 September 2015	A male tourist from China, 31-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Phangan Island, Surat Thani Province	31 July 2015	A Thai female tourist, 35-year-old, died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Poda Island, Krabi Province	2015	A Thai tourist boy, 11-year-old, was severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Phuket Province		January 2014	A male tourist from Russia, 39-year-old, severely injured after a jellyfish sting (suspected Irukandji syndrome).	Unknown box jellyfish	Division of Epidemiology, Thailand

Country	Location	Date	Case	Species	Reference
Thailand	Phangan Island, Surat Thani Province	23 August 2014	An 5-year-old died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Krabi Province		2014	A Thai female tourist, 40-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Samui Island, Surat Thani Province		2014	A Thai female tourist, 22-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Langsuan, Chumphon Province		2014	A Burmese, 19-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Samui Island, Surat Thani Province		2014	A male tourist from Russia, 32-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Tarutao Island, Satun Province		2014	A Thai fisherman, 39-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
Samui Island, Surat Thani Province		2014	A male tourist from England, 45-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand

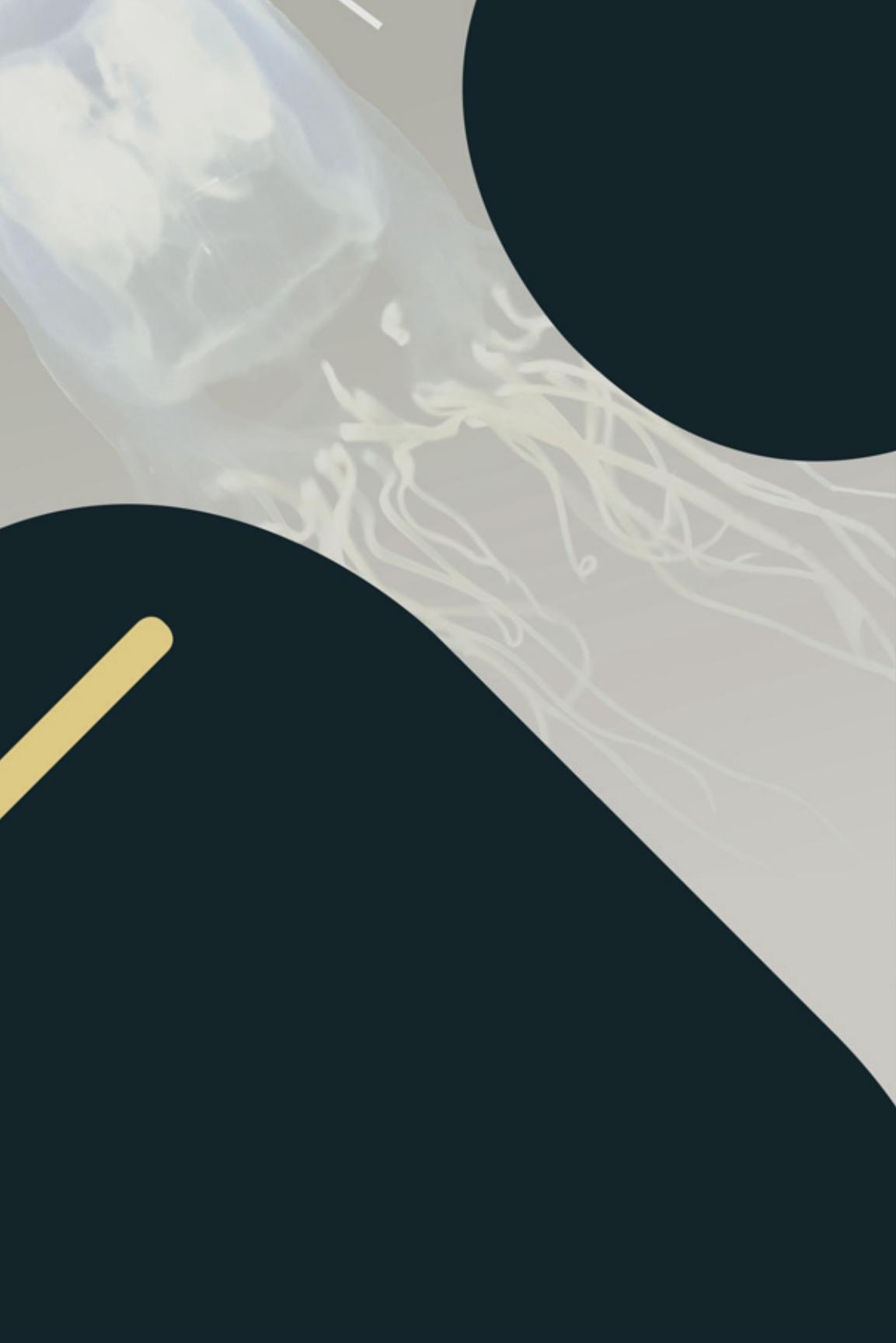
Country	Location	Date	Case	Species	Reference
Thailand	Phuket	2013	A male tourist from China, 31-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Cha-am Beach, Phetchaburi Province	23 March 2013	An 21-year-old Thai man, severe injury and unconsciousness after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Kood Island, Trat Province	9 December 2012	A Thai girl, 2-year-old, severe injury and unconsciousness after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	15 July 2012	A tourist girl from Italy, 6-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	2012	A female tourist from America, 33-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Railay Beach, Krabi Province	2011	A female tourist from England, 29-year-old, severely injured after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Phangan Island, Surat Thani Province	3 September 2010	A female tourist from America, 26-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand

Country	Location	Date	Case	Species	Reference
Thailand	Mak Island, Trat Province	3 March 2010	A tourist girl from Sweden, 9-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Lanta Island, Krabi Province	3 April 2008	A female tourist from Sweden, 11-year-old, died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Mak Island, Trat Province	30 December 2007	A tourist boy from Australia, 4-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Tao Island, Surat Thani Province	13 December 2007	A male tourist from England, 35-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Samui Island, Surat Thani Province	11 September 2006	A female tourist from Russia, 33-year-old, severely injured and unconscious after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Phangan Island, Surat Thani Province	10 August 2002	A female tourist from Switzerland, 23-year-old, died the day after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand
	Phangan Island, Surat Thani Province	9 August 2002	A male tourist from Australia, 25-year-old, died after a jellyfish sting.	Unknown box jellyfish	Division of Epidemiology, Thailand

Country	Location	Date	Case	Species	Reference
Vietnam	Nha Trang	April 2021	A young boy saw a thing like plastic and tried to collect it, and got stung after that.	<i>Physalia physalis</i> [as Portuguese man-of-war]	Media: Facebook https://www.facebook.com/kylerodsteward
		May 2019	Local people got stung while swimming.	Unknown	Media: Facebook fb.com/340555446859293/posts/340605680187603/
		April 2019	A marine biologist (VAST) got stung during field work.	<i>Linuche</i> sp. [as <i>Linuche unguiculata</i>]	Personal report

Remarks

- * Note to all *Physalia* related cases in Indonesia: Despite the lack of age data, the beach lifeguards reported that the victims were mainly young children. They were attracted by the distinctive colour and the bottle like-shape of the pneumatophore of the *P. physalis* that scattered abundantly on the beaches. The beach lifeguards conducted symptomatic treatment and topical first aid by spraying with 5% food vinegar and immersion with hot water, if available. All treatments were applied by the beach lifeguards that the first aid training has trained to the jellyfish's envenomation conducted voluntarily by Toxinology Society of Indonesia (TSI) and Remote Envenomation Consultancy Services (RECS) Indonesia since 2013. According to the beach lifeguards' experiences, the local symptoms disappeared a few hours after treatment with the food vinegar. In severe cases with dyspnoea, nausea, vomiting, or cephalgia, the patients were treated with analgesic and antiemetic drugs. The dermal mark due to *Physalia*'s envenomation had hyperaemia and moderate local pain. These signs and symptoms lasted 1 to 3 days.





CHAPTER 3

MONITORING AND PREVENTION OF JELLYFISH STINGS

Monitoring and Prevention of Jellyfish Stings

As the adage goes: “prevention is better than cure”—this is aptly applicable to the management of envenomation. Where there is an impossibility of eliminating the risk of marine envenomation for water-bound islands and archipelagos, with human inhabitants’ reliance on the sea for various levels of need, establishing safety protocols for monitoring and prevention is the next best thing.

The establishment of a national monitoring system for harmful jellyfish blooms is vital to identify high-risk areas and establish longitudinal baseline information on jellyfish occurrence in response to changing conditions of the oceans (due to both natural and anthropogenic factors). This will most directly enable local governments to implement early preventive measures and alert the general public. The patchiness of the current understanding of species-specific jellyfish occurrence in the region presents a challenge for monitoring as non-concerted efforts can be costly.

Preventive measures for hazardous jellyfish envenomation are crucial particularly during jellyfish blooming seasons. Such measures aim to reduce human-jellyfish contact. This includes issuing alerts, placing up signages, installation of stinger nets, designating no-swim zones, and advising appropriate clothing for water activities (e.g., long-sleeved rash guards and leggings). In addition to reducing contact, the creation of emergency response systems is an important form of preparedness to treat victims of jellyfish stings, especially in coastal towns where interactions may be inevitable. Where applicable, the system should include training of locals such as fishermen, boat operators, tour guides, resort staff, and life guards in administering first aid and managing jellyfish stings. Collaboration amongst all relevant public institutions and private companies is essential for effective and consistent implementation.

Due to the differing severity of jellyfish envenomation problems from country to country, the impetus of governance priorities and availability of on-ground resources, monitoring, and prevention strategies of jellyfish envenomation varies from place to place, beach to beach. Challenges faced by authorities are varied as well, depending on the physical and virtual accessibility of communities (especially in rural villages) and reach of medical services. Table 2 shows the monitoring and preventive measures taken by countries in the Western Pacific and adjacent areas.

Table 2. Summary of monitoring and preventive measures taken by countries in the Western Pacific and adjacent areas.

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
1	Bangladesh	None	None	None	Jellyfish aggregation events, and its potential socio-economic and health implications have been reported in news media.
2	Indonesia	By 2022, The Ministry of Health has built a system of prevention, promotion, curative, and rehabilitation of jellyfish envenomation. This program funds to collect data and conduct research for universities and professionals.	PPE (safety swimsuit).	Bring a bottle of vinegar to the beach	The collaboration between the beach lifeguard unit with mini hospitals in terms of reporting to the department of health districts and provinces and enables proper data collection in the Ministry of Health of Indonesia.

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
3	Malaysia	Funding for the local universities to conduct the related research & monitoring. Presence of Standard Operating Procedure (SOP) for sewage discharge near coastal areas. Organise water/coastal-related sports/events with advice from the research team & first-aid department. Jellyfish warning signboards and vinegar poles at hotels. Beach netting in certain hotels with private beaches.	Water sports with full-covered swimsuit	Sessional awareness campaign regarding appropriate intervention for initial jellyfish sting by nongovernmental organization [e.g., Malaysian Society on Toxinology (MST)]	Not available due to inconsistent jellyfish season Life guard in public beach during high tourist season [i.e., Pulau Langkawi]

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
4	Philippines	No advisories and warning notices from the national authorities. Signposts were placed in some designated areas. Monitoring efforts should be done by local authorities.	Avoiding areas with box jellyfish sightings. Initiatives from the beach resort owners including the coastal communities should be enhanced and capacitated.	Advised to have early consultation with nearest hospital facilities. Bringing a first aid kit with vinegar on the beach or during island boat tours. Teleconsultation with specialists regarding jellyfish stings.	Media reports of jellyfish stings and sightings through social media and news reports. Community education and awareness training/ workshops are done by NGOs (e.g., Philippine Toxinology Society, Inc; RECS ASEAN). Warning signage posted on selected beach resorts.

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
5	Singapore	Advisories have been issued to local authorities (i.e., NParks). Warning signposts have also been placed at frequently visited public marine spaces. Monitoring efforts to document jellyfish seasonality have not been established, however, another local statutory board (i.e., the National Research Foundation) has recently funded a preliminary, 2-year study that will be targeted on jellyfish blooms in warming tropical seas.	NParks advises beach goers to, "Leave as little skin exposed as possible e.g., wear a longsleeved shirt and pants, or a wetsuit"	Among recommendations that NParks has issued, they have included: Not engaging in marine activities alone Bring a bottle of vinegar	At present, there are no synchronized efforts to warn the public – most current efforts are on an ad-hoc basis. The lack of regular, long-term monitoring of local jellyfish populations, as with accurate taxonomic efforts, has impeded this. Not touch or approach jellyfish, on the shore or be it in the waters.

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
6	Sri Lanka	National Aquatic Resources Research and Development Agency (NARA) [http://www.nara.ac.lk/] monitors jellyfish outbreaks on beaches. The National Poisons Information Centre, National Hospital of Sri Lanka [http://www.toxbase.lanka.info/] monitors jellyfish envenomation incidents.	Avoid water during jellyfish season; use protective lotions; wear a protective suit.	Apply vinegar Seek medical attention by calling the ' <i>Suwa Sariya</i> ', free emergency ambulance service of Sri Lanka.	NARA makes press statements on jellyfish outbreaks. The National Poisons Information Centre advises health care professionals and the public about acute poisoning situations. Mass media provide public education / risk communication.

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
7	Thailand	<p>Post warning signs with first aid instructions Thai, English, Chinese, etc.) and vinegar poles on the tourist beaches.</p> <p>Provide leaflets (Thai, English, Chinese) for hotel/resort/ long-tail boat/National parks/tourism-related organisations.</p> <p>Provide training for the health professionals, non-health professionals, and communities from local to international levels.</p> <p>Use a stinger net at the beach where box jellyfish might be present.</p>	<p>Wear protective clothing: wear a lycra suit or if unavailable a long-sleeved shirt and pants that are tight and cover all skin surfaces.</p>	<p>Prepare a first aid kit that contains vinegar (4-6% acetic acid). If being stung, pour the vinegar continuously to the affected areas for at least 30 seconds. Vinegar will prevent the firing of sting cells (containing venom) that remain on the body.</p> <p>Do not swim at night, during and after raining.</p>	<p>Toxic jellyfish networks cover both coasts of Thailand. The expert members verify and confirm cases before warning via networks and surveillance systems.</p> <p>During the season that has high incidents (based on data), the toxic jellyfish networks alert and provide knowledge and materials.</p> <p>The expert joins/supervises guru team in conducting surveillance, prevent, transfer knowledge, and solve the problems.</p>

No	Country	Beach Surveillance Activities (e.g. local government, hoteliers)	Safety Seeking Behaviour Campaign	Health Seeking Behaviour Campaign	Public Awareness Activities (e.g. media, first aid courses, signages)
	Thailand	Provide knowledge and recommendation for national and international sport event that involving sea activity.	In model province, local networks of guru are established and non-health and health personnel are trained to be guru/trainer for communities.		
8	Vietnam		Nha Trang beach guards (government organisation) update knowledge from training results.	Warning people during jellyfish season.	No incorporated methods of warning are practised so far.
			Placing vinegar bottles on the beach.		





CHAPTER 4

SIGNS AND SYMPTOMS OF JELLYFISH STINGS

Sings and Symptoms of Jellyfish Stings

4.1 The Characteristics or Distinguishing Features of Jellyfish Stings

The characteristics or distinguishing features of jellyfish stings will depend on the type of jellyfish that a person is in contact with. The contact with jellyfish species may or may not produce significant signs and symptoms. The severity of envenomation also varies according to the jellyfish species and the amount of venom that is injected into the body. Some may cause significant injuries that may present as pain, swelling, skin lesions, blisters, and rashes that may persist for days or weeks and there are those that only last for a short duration (less than 24 hours). Some severe cases of envenoming may result in chronic issues (morbidity) and even death (mortality).

Envenomation

Envenomation happens when venom is introduced into a human being or an animal to produce a range of clinical effects. Jellyfish venom is stored in the stinger cells called cnidocytes, which are arranged in clusters on the tentacles or on the outer surface of the jellyfish. Nematocysts activation can be triggered by mechanical (contact) or chemical stimuli. Upon stimulation, the nematocysts barb and thread will rapidly uncoil to penetrate the skin and inject the venom (Fig. 4).

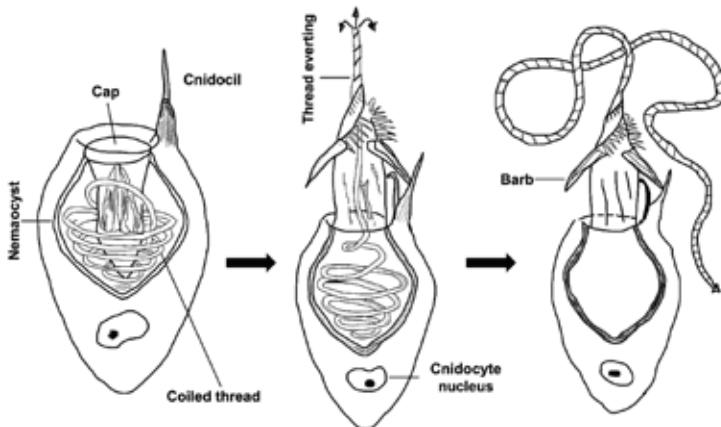


Fig. 4. Stages of the nematocyst discharge. Image reproduced based on G Kass-Simon and A A Scappaticci, Jr. "The behavioral and developmental physiology of nematocysts." *Canadian Journal of Zoology*. 80(10): 1772-1794.

Harmful jellyfish stings can be caused by:

- a. Box jellyfishes (cubozoans)
 - i) Multi-tentacled box jellyfish
 - with branched pedalia: Species of the order Chirodropida, e.g. *Chironex* spp.
 - ii) Single-tentacled box jellyfish
 - with unbranched pedalia: Species of the order Carybdeida, e.g. *Carukia* spp., *Malo* spp., *Morbakka* spp.
- b. Portuguese man-of-war / Blue bottle jellyfish (hydrozoan): *Physalia physalis*
- c. Other jellyfishes (scyphozoans)

4.2 Box Jellyfish (Cubozoa) Stings

Box jellyfish envenomation may be fatal. Signs and symptoms of box jellyfish and envenomation will depend on their type - multi-tentacles per pedalium or single-tentacle per pedalium. The most common differentiating feature of multi-tentacled and single-tentacled box jellyfish stings are shown below in Table 3.

Table 3. Common signs and symptoms of multi-tentacled and single-tentacled box jellyfish stings

Signs and symptoms	Multi-tentacled	Single-tentacled
Pain upon contact	Severe, Immediate	Mild
Skin lesion	Welts (whip-like pattern)	Minimal and transient
Muscle and back pain	Uncommon	Commonly delayed
General systemic effect	Early arrhythmia or cardiorespiratory arrest	Delayed symptoms such as anxiety, cardiac arrhythmia, pulmonary oedema, heart failure, and arterial hypertension

The appearance of the skin lesion on contact is more prominent in multi-tentacled box jellyfish stings with the possible papular urticarial eruption at the area of contact. Tentacle contact marks (typically a “ladder” pattern) often with an adherent tentacle on the skin. The symptoms can vary from mild itchiness, burning, or throbbing pain. The contact body part may be inflamed with wheal formation. The rash can progress to vesicular, haemorrhage, or even necrotizing lesions. The single-tentacle box jellyfish sting causes minimal or transient skin changes. It rarely caused any blistering. However, the majority of cases involving *Morbakka* sp. in Thailand had serious skin lesions due to the size of the jellyfish and inadequate first aid treatment.

The systemic effects include headache, nausea, vomiting, syncope, muscle spasm, and paresthesia. In very severe cases, a victim may collapse due to cardiac arrhythmias, cardiac arrest, or respiratory distress with cardiogenic / non-cardiogenic pulmonary edema.

A. Multi-tentacled Box Jellyfish – Chirodropids

Clinical presentations

Local signs and symptoms:

- Tentacle contact marks (typically a whiplash-like lesion or frosted ladder pattern) corresponding to the transverse bands on the tentacles that may adhere to the skin. Skin blistering can develop into necrosis that affects the entire thickness of the skin, resulting in scars or keloid formation
- Immediate intense local pain in areas of contact
- Contact dermatitis in certain victims

Systemic effects:

- Non-specific symptoms of distress secondary to intense local pain e.g., nausea, vomiting
- In very severe cases, collapse with cardiac arrhythmia or cardiac arrest
- In severe cases, respiratory distress
- In special populations (children), the severity of envenoming is dose dependent. Small children are more likely to receive potentially lethal doses. In recent years, most fatalities from box jellyfish stings have been in children



Case A-1

A 17-years-old boy stung by *Chironex* sp. in Sandakan, Sabah He applied vinegar immediately post sting. He arrived at the hospital 1 hour after the incident with a pain score of 7/10. The skin sampling analysis was done and there was presence of typical discharges of *Chironex* nematocyst identified. Estimated body surface area (BSA) involved was 10%.



Day 0 post sting



Skin sampling analysis



Day 1 post sting



Image courtesy of Remote Envenomation Consultancy Services (RECS) ASEAN.

Case A-2

Fatal box jellyfish case in Lahad Datu, Sabah. Skin sample analysis was taken.



Image courtesy of Muhamad Na'im.

Case A-3

A 7-year-old boy was writhing in pain before collapsing ten minutes later. Long trailing tentacles were seen attached to his left arm and his mother frantically removed them with her own hands. A cause of death was not immediately, and an autopsy was conducted. Examination done found “shoe-lace” like lesions on the left arm, the chest, and the abdomen.

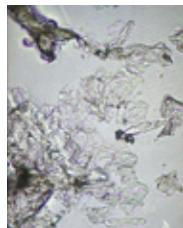
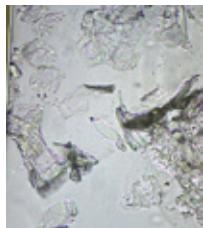


Image courtesy of Dzureena Abdul Mutualib and Nurul Huda Husna Harun.

Case A-4

A 25-year-old male alleged stung by unidentified marine organism suspected to be jellyfish due to tentacle lash marks retained. He immediately applied vinegar. He presented with skin rashes (dermatitis) that is not typical of box jellyfish sting. However, skin sampling analysis shows *Chironex yamaguchii* nematocysts. Image courtesy of Muhamad Na'im.

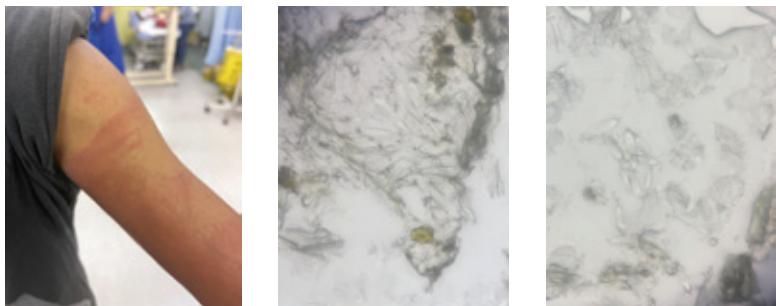


Image courtesy of Muhamad Na'im.

Case A-5

A case from the Philippines. A male victim was stung by a jellyfish on his right arm. Note of the whiplike lesions on the arm possibly by *Chironex* sp.



Image courtesy of RECS ASEAN.

B. Single-tentacled Box Jellyfish - Carybdeids

Clinical presentations

Local signs and symptoms:

- The area of sting contact can be very small and local pain may not be significant, although sometimes the sting is immediately painful
- Minimal local erythema, possibly transient small blisters
- Localised sweating

General systemic effects:

- After a variable interval, most commonly around 20 - 40 minutes post sting, there is onset of systemic envenoming and associated symptoms
- Irukandji syndrome can be fatal. Cases of intracranial haemorrhage and death after envenoming by *Carukia barnesi* have been described in Australia
- Irukandji-like syndromes are said to occur after stings from *Morbakka virulenta*, *Tamoya* spp., *Gonionemus vertens* [= *Gonionemus oshoro*], *Stomolophus* spp., and possibly other species

Irukandji / Irukandji-like syndrome

Systemic effects (20-40 minutes post sting):

- a. Myalgic limb pain or cramp
- b. Severe back pain
- c. Abdominal cramp
- d. Severe headache
- e. Nausea/vomiting
- f. Pallor
- g. Profuse sweating
- h. Prostration
- i. Generalised erythematous rash
- j. Agitation/restlessness
- k. A feeling of panic or impending doom
- l. Generalised vasoconstriction

- m. Severe hypertension
- n. Chest tightness
- o. Variable cardiac dysfunctions (reduced cardiac function on echocardiography – particularly left ventricular dysfunction, occasional elevated troponin, pulmonary edema). Severe cardiac dysfunction may require intubation and inotropic support.

Case B-1

A 46-year-old male presented with generalised muscle pain at lower abdomen, lower back, bilateral thigh, and calf pain at 8 hours post sting by palm size transparent jellyfish. Tentacle lash mark: Less tentacle imprint on skin, minimal in number and less inflammation. More lesions at upper body that is consistent with *Morbakka* sp. that tends to swim more on the surface. Clinical presentation: Delayed severe muscle pain - Irukandji-like syndrome. Nematocyst sampling: very minimal nematocyst yield could be attributed to the nature of the carybdeid sting or old and interference of the specimen.

Nematocyst: mastigaphore type, cucumber shape: lack of band, thinning and more straight compared to native *Chironex yamaguchii*.

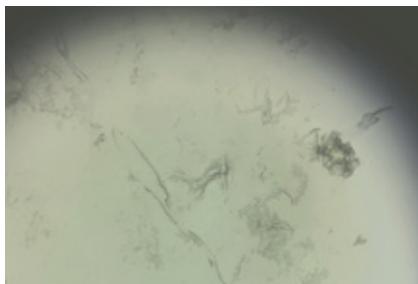


Image courtesy of Amirizal Bin Che Embi and Muhamad Na'im.

Case B-2

A 37-year-old man, stung at Teluk Bayu, Teluk Kumbang, Penang. The tentacle was stuck at the site and was removed. He had shortness of breath and cramping. He was about 1-metre deep in the water when being stung. The burning pain was immediate with a pain score of 5/10 and increasing. The tentacle was short around 4-5 cm and clear coloured. Patient removed it with hand, passed urine and applied vinegar bought from the nearby stall before going to the healthcare facility. The onset of abdominal pain and shortness of breath onset was about 30 minutes later. It was possible *Morbakka* sp. sting envenoming.



Image courtesy of RECS ASEAN.

Case B-3

A male was stung on the forearm and needed to be on breathing support due to respiratory distress. A carybdeid sting was suspected and the picture of the stung site showed local area hyperhidrosis.



Image courtesy of RECS ASEAN.

4.3 Portuguese Man-of-War / Bluebottle (Hydrozoa) Stings

Clinical presentation

Local signs and symptoms:

- There can be immediate pain lasting over 1 hour or more, with typical elliptical blanched wheals, surrounding erythema, and there may be linear urticarial or papular skin marks that can be very long.

Systemic effects:

- Usually, systemic symptoms range from none to mild, but generalised muscle cramps and spasms of the abdominal musculature may occur
- Cardiac dysrhythmias, cardiac insufficiency, cardiac failure, irreversible coma that can be due to primary respiratory failure
- Signs of respiratory insufficiency / respiratory failure, respiratory arrest that can be due to central neurological effect of the venom
- Acute renal failure with concomitant hemolysis
- Nausea/vomiting



Case C-1

Physalia physalis sting on a 13-year-old boy at a beach resort on Tioman Island, Malaysia. The victim was in stable condition.



Physalia physalis found on the beach.

Image courtesy of RECS ASEAN.

Case C-2

Physalia physalis sting on a 9-year-old boy, tourist from the Czech Republic. He presented with severe pain that was well controlled with intravenous morphine.



Image courtesy of Dr Mohamad Hamim Mohamad Hanifah.

4.4 Other Jellyfish (Scyphozoa) Stings

Clinical presentation

- Clinical effects of jellyfish stings can be highly variable, depending on the species of jellyfish, the area of tentacle contact, and the size and health of the patient.
- The following list includes some key symptoms and signs, although not all of these will be present in every case:
 - a. Local discomfort or pain (mild to severe)
 - b. Tentacle or bell contact marks on the skin
 - c. Local erythema
 - d. Local blistering
 - e. Generalised erythema/rash
 - f. Non-specific systemic symptoms
 - g. Painful corneal lesions due to jellyfish stings to the eye
 - h. Severe cyanosis due to arterial insufficiency



Case D-1

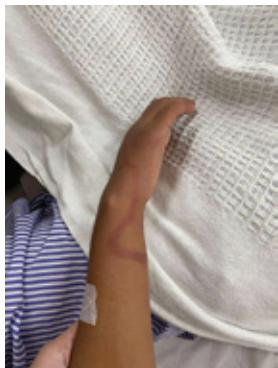
An 11-year-old boy was stung by an unidentified jellyfish over his right forearm and left inner thigh while swimming in the sea at Teluk Bahang, Penang. He experienced pain and swelling over the affected site and was treated with analgesia as an outpatient. He presented back with complaints of right thumb numbness, shortness of breath and headache on day 4 post-incident. He was treated as a possible systemic vasospasm with hypertensive crisis. The vasospasm caused circulatory compromise. Intravenous iloprost was tried for right limb salvage. He was well and discharged 3 weeks later.



Image courtesy of RECS ASEAN.

Case D-2

A case of unidentified jellyfish sting at Tanjung Bungah near Batu Ferringhi Beach, Penang.



Possible suspect: *Chrysaora chinensis* spotted very close to shore at Teluk Bahang, Penang.

Image courtesy of RECS ASEAN.

Case D-3

An 8-year-old boy was stung by a jellyfish at Pantai Bersih, Kepala Batas, Penang. The patient had swelling and redness over the right forearm associated with local pain, with a pain score of 2/10. He also had abdominal pain 30 minutes post sting. He had bilateral lower limb weakness but was able to walk with a normal gait. There were linear superficial lesions and erythematous, non-circumferential marks on the right forearm with mild tenderness and swelling. He was discharged 2 days later.



Photos of victim upon discharge.



Image courtesy of RECS ASEAN.

Case D-4

A family of 5 siblings were stung at Hompton Beach Hotel, Penang. One of the children was admitted to the hospital for observation.



Day 0 picture of the child that was admitted.



Day 6 picture of the child that been admitted. He was discharged well with no sequelae.



Day 3 picture of the other child as the stung area wound resolved.

Image courtesy of RECS ASEAN.

Case D-5

A case from Cebu, Philippines. Rashes from *Linuche* sp. (seabathers' rash). The characteristic rashes produced by *Linuche* sp. are raised papular erythematous rashes in the exposed areas of the body of the victim.



Image courtesy of Serafin M. Geson III.

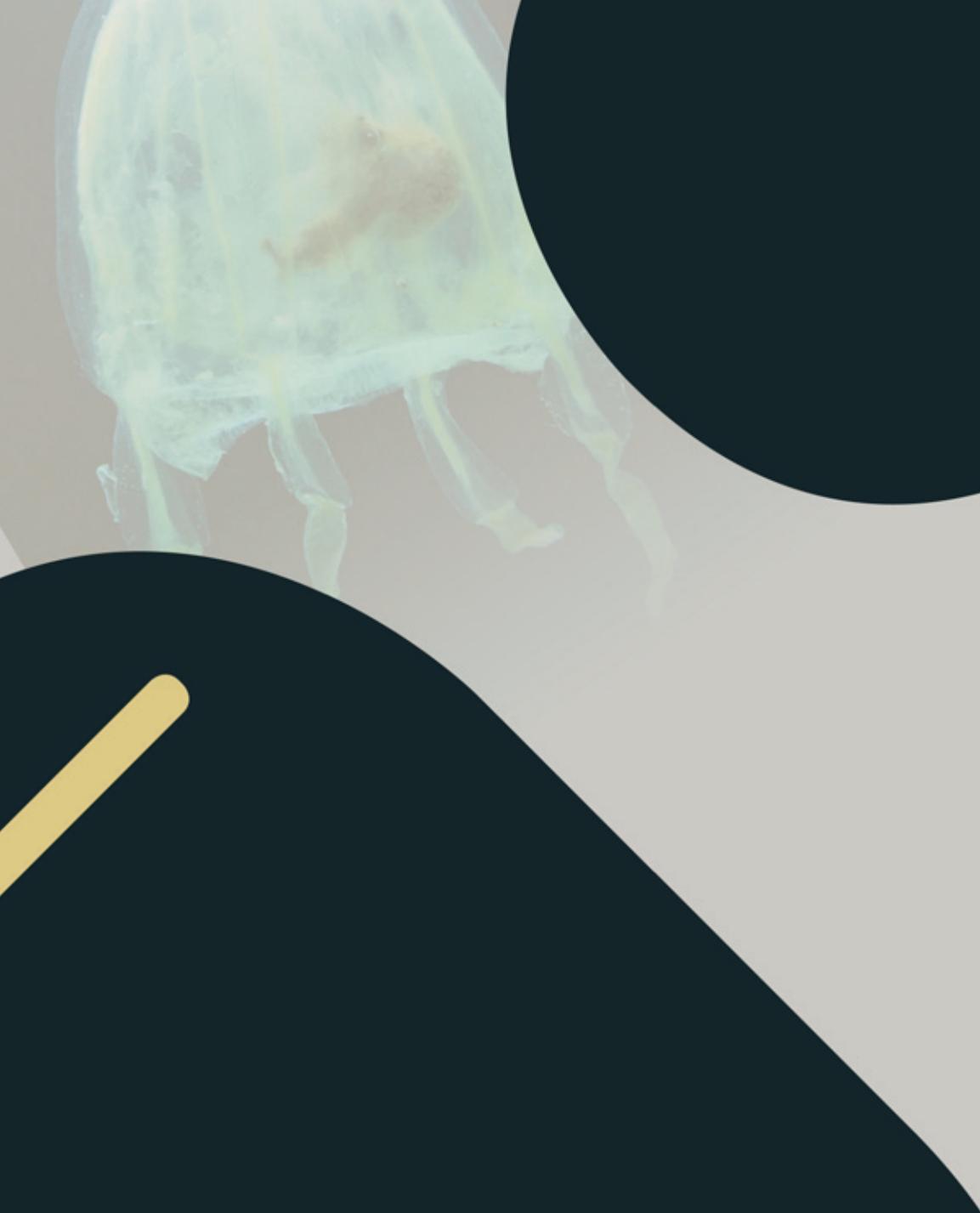
Case D-6

A case from Lahad Datu Sabah during the *Lobonemoides robustus* blooming season.



Image courtesy of Muhamad Na'im.







CHAPTER 5

EARLY INTERVENTION OF JELLYFISH STINGS (FIRST AID)

Early Intervention of Jellyfish Stings (First Aid)

Timely appropriate intervention following jellyfish stings can minimise the severity of injury and envenomation. The two main objectives for early intervention are:

1. To minimise the risk of severe envenomation
2. To provide a degree of pain relief prior to hospital arrival

Species identification is not necessary for early intervention of jellyfish stings. The protocol below can be followed if the patient is suspected of being stung by jellyfish. Immediate transport of the victim to the nearest health facility is the utmost priority.

1. Ensure safety at the scene

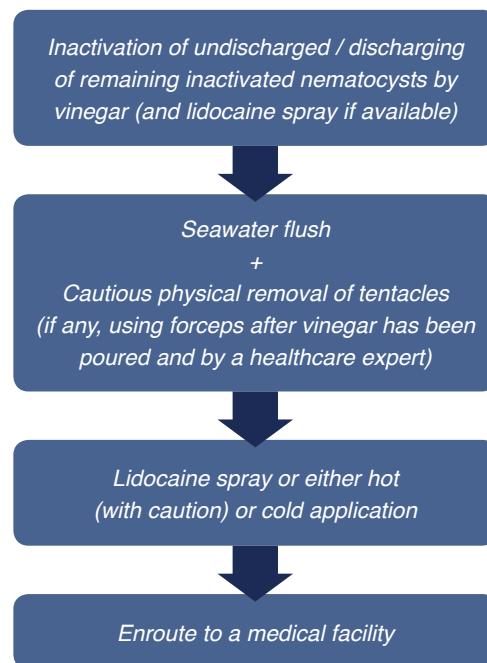
The priority in the early intervention of jellyfish stings is to secure the safety of both the victim and the rescuer or the first aid responder.

- Call for help.
- Make sure that the rescuer is safe from being stung by the jellyfish.
- Move the victim out of the water.
- Place the victim flat and calm the victim.
- Do not leave the victim alone.

2. Early intervention

- The intention is to decrease venom exposure as early as possible and provide a reasonable measure of analgesia enroute to the medical facility.

- Method:



Note:

- Avoid interference or manipulation of the wound, apart from the above early intervention prior to arrival to a healthcare facility.
- Provision of good quality public/first aider CPR (cardiopulmonary resuscitation/ chest compressions) is of paramount importance in the event of cardiovascular compromise until the effort is taken over by hospital care professionals.
- Application of heat/cold procedure via any method should not take precedence to urgent transport to the safe environment of a medical facility.
- A small trial suggests cold water works as well as hot water, more readily available and ease of use with greater safety margin of cold items on the beach that might push towards its use.

3. Cardiopulmonary Resuscitation (CPR)

- If the victim is UNRESPONSIVE or becomes UNRESPONSIVE, proceed with cardiopulmonary resuscitation (CPR).

Perform cardiorespiratory resuscitation in the following steps (Fig. 5) :

a. Check for responsiveness

- Tap the victim on both shoulders to assess responsiveness.

b. Ask for help

- Ask someone to get help.
- Call the country emergency number hotline, emergency response staff, or ambulance.
- Ask someone to get an AED nearby.

c. Start chest compressions

- Place both hands on top of the other at the centre of the victim's chest.
- Compress at the rate of 100-120 per minute and depth of 5 to 6 cm for the adult.
- Allow full chest recoil.
- Minimise interruption while doing chest compression.

d. Wait for help to arrive and bring the patient immediately to the nearest healthcare facility.

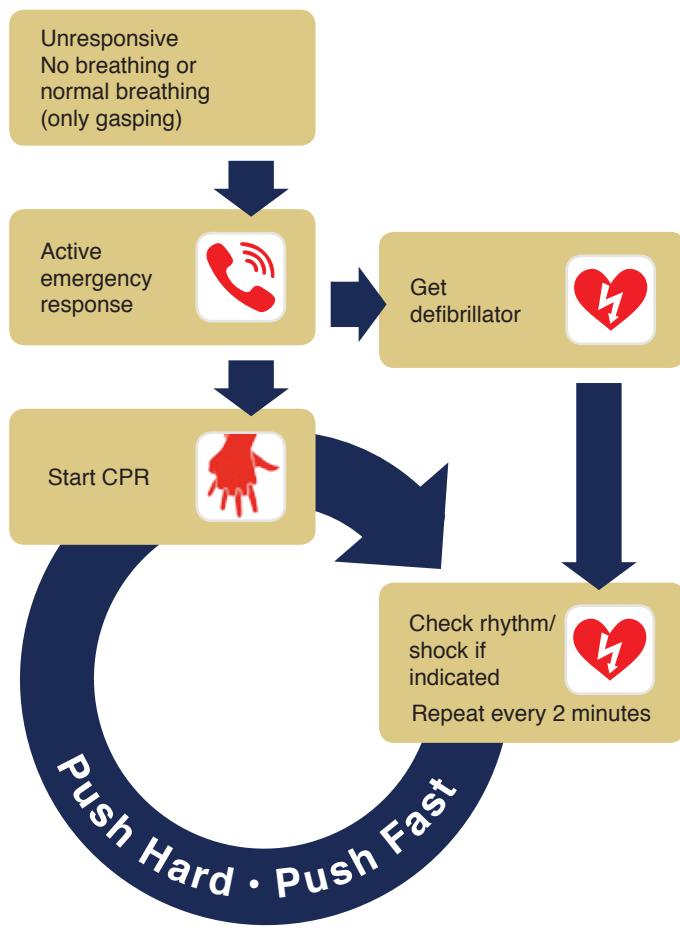


Fig. 5. Simplified Adult Basic Life Support (BLS) Algorithm,
adopted from American Heart Association, 2020.





CHAPTER 6

APPROPRIATE RESPONSE TO JELLYFISH THREAT BY COUNTRIES IN THE WESTERN PACIFIC AND ADJACENT AREAS

Appropriate Response to Jellyfish Threat by Countries in the Western Pacific and Adjacent Areas

Discussing appropriateness of a response requires a definition of the need for a response. With regards to the negative impact of jellyfish on human well-being, defining the threat—when the threat occurs, whom the threat impacts, the severity of impact, responders, and stakeholders involved—can help to advise directed actions from relevant agencies and identify gaps for further action. Continuous data collection (from field surveys or oral histories to medical and emergency cases) and adequate identification of jellyfish remain fundamental to the resolution of baseline data and defining the temporal-specific need for response (i.e. increased jellyfish population or blooming seasons) in specific regions.

Approaches of responses can be bottom-up or top-down. Bottom-up, for example, being from individuals or non-governmental organisations implementing on-ground change and informing higher level authorities where required. Top-down, for example, being from governmental or ministerial levels creating multi-ministry taskforces to orchestrate concerted efforts to tackle a complex problem. Effective local responses require an astute understanding of cultural, societal, and infrastructural nuances within affected districts (e.g. online first aid consultation would not work well for rural areas without adequate infrastructure to support such a service).

Regarding the overlap in human-jellyfish interfaces, threats could range from affecting largescale fisheries and power plants to envenomation of beach goers. More often than not, a combination of bottom-up and top-down responses are required for sustainable progress in alleviating impacts of jellyfish threats. Table 4 shows the appropriate response and actions of countries to jellyfish threat in the Western Pacific and adjacent areas.

Table 4. Appropriate response and actions of countries to jellyfish threat in the Western Pacific and adjacent areas.

No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
1	Bangladesh	No baseline data, but jellyfish swarming events reported in March, August, and September.	None	Ministries / Departments (Fisheries Tourism), Local government units, NGOs	Surveillance, safe tourism, public awareness program
2	Indonesia	June - August (<i>Physalia physalis</i>)	119	University and Research organisations Local beach lifeguards Local mini hospital (PUSKESMAS)	Identify jellyfish species, research, education / training. To collect jellyfish envenomation data, deliver the first aid. Surveillance cases, first aid, and treatment of patients.

Awareness program, collecting total data from districts or provinces.

Local Department of Health (districts and provinces)

Ministry of Health

National reduction program and plan and budgeting the drugs, PPE, promotion awareness program, national guideline jellyfish envenomation, training online and offline collaboration with Indonesia Toxinology Society.

Indonesia Toxinology Society and Professional Society

Online consultation first aid, treatment and awareness program, training online.

No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
3	Malaysia	Northern Straits of Malacca (All-year round) Klang Straits (All-year round but peak in abundance as below) <i>Phyllorhiza punctata</i> : November-February <i>Cyanea</i> sp.: February-September <i>Chrysaora chinensis</i> : November-August <i>Labonemoides robustus</i> : July-October South China Sea, Borneo (Scyphozoan: February-May)	999	Local District Health Office Fisheries Department Clinic/Hospital University (i.e., CEMACS, USM, UMS, UPM and UM) Hotellers	To collect jellyfish sting cases database. Surveillance Treatment of patients, awareness program. The surveillance program to identify new jellyfish species. Prepare for netting when there is jellyfish season on the beaches, signboard, vinegar station, life guards. Awareness program (ASSB/AHSB) Marine Envenomation and Poisoning Course (MEP) for healthcare providers Asean Marine and Snake Envenomation Management Symposium Course (AMSEM) for healthcare providers and researchers in the field Mainstream media involvement Social media awareness campaign

No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
4	Philippines	All-year round though predominantly during May - August (summer to early part of rainy season)	911 / local emergency hotlines	<p>Department of Tourism</p> <p>Department of Health</p> <p>Department of Agriculture – Bureau of Fisheries and Aquatic Resources</p> <p>Non-government organisations</p> <p>Local government units/ Department of Interior and Local Government</p> <p>Resort owners/local coastal communities</p>	<p>Prioritisation of safe tourism through constant quality safety measures e.g., provision of training for lifeguards and tour guides on jellyfish stings and standardisation of risk and hazard prevention in tourism facilities should be implemented.</p> <p>Proper training of healthcare workers on the management of jellyfish stings is needed in the local communities and regional facilities.</p> <p>These units could establish a national monitoring system for harmful jellyfish blooms with representative pilot sites in any of the high-risk locations.</p> <p>Community awareness and educational programs. Training for first aid and management of jellyfish stings in the prehospital setting (Philippine Toxinology Society, Inc)</p> <p>can make policies and guidelines for the formation of local management and emergency response teams in high-risk areas.</p> <p>Awareness and knowledge on the risk of jellyfish stings in the area. Preventive measures should be implemented and guidance to the tourist and/or locals should be considered.</p>

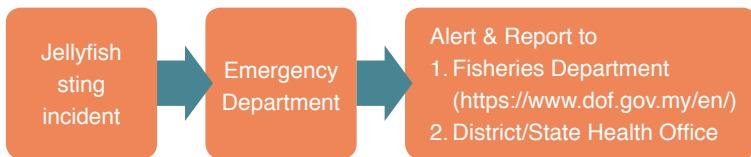
No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
5	Singapore	No baseline data available	995	General: Singapore Civil Defence Force (SCDF)	At present, the SCDF only deals with victims with jellyfish injuries that are life-threatening (i.e., “...with stings covering more than half of one limb...”; see: https://www.nparks.gov.sg/gardensparks-and-nature/dos-anddonts/animal-advisories/boxjellyfish)

No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
6	Sri Lanka	Southwest coast (June-July) Northeast coast (December-January)	+94112 686 143 (advice on first aid) 1990 (for free emergency ambulance service)	Divisional councils (<i>Pradeshiya Sabha</i>) National Aquatic Resources Research and Development Agency (NARA) The National Poisons Information Centre, National Hospital of Sri Lanka Divisional hospitals Wayamba University of Sri Lanka Hoteliers Non-governmental organisations	Displaying jellyfish warning signposts; lifeguard is on patrol at the beach. Research, and press statements on jellyfish outbreaks. Advice to health care professionals and the public about acute poisoning situations. Treatment of patients; awareness programs. Identifying harmful jellyfish species. Installation of jellyfish prevention nets and vinegar stations. Conducting public awareness programs.

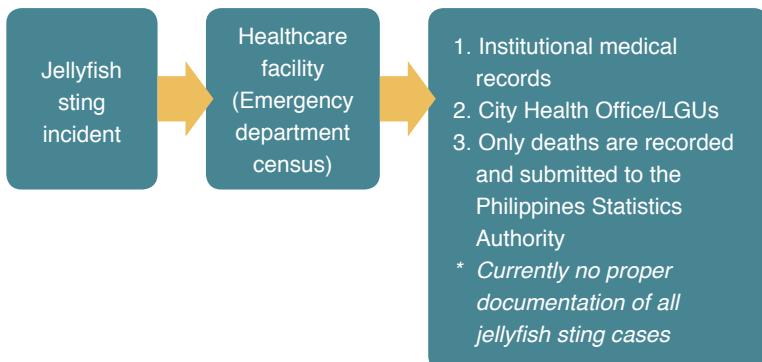
No	Country	Month of jellyfish blooms	Emergency number	Agencies involved	Action from the agencies involved
7	Thailand	Andaman Sea (April-November) Eastern Gulf of Thailand (January-August and November-December) Center and Lower Gulf of Thailand (January-February and July-December)	1669 1367 +66-2-419-7007	Department of Disease Control Ramathibodi Poison Center Siriraj Poison Control Center	Development of an event-based surveillance system for fatal and severe jellyfish stings reporting from the provincial level to the Department of Disease Control. Establishment of surveillance and rapid response team (SRRT) to conduct case/ incident investigation of fatal and severe jellyfish stings. Provide consultations and advice for diagnosis and proper management of jellyfish envenomation. Provide consultations and advice for diagnosis and proper management of jellyfish envenomation.

The appropriate response should be in place to avoid significant injuries in humans. Early activation of the emergency response system and appropriate actions from different agencies will be beneficial in downsizing the threat of jellyfish stings in the region. Below is the reporting process after a jellyfish sting incident in a few Western Pacific and adjacent countries.

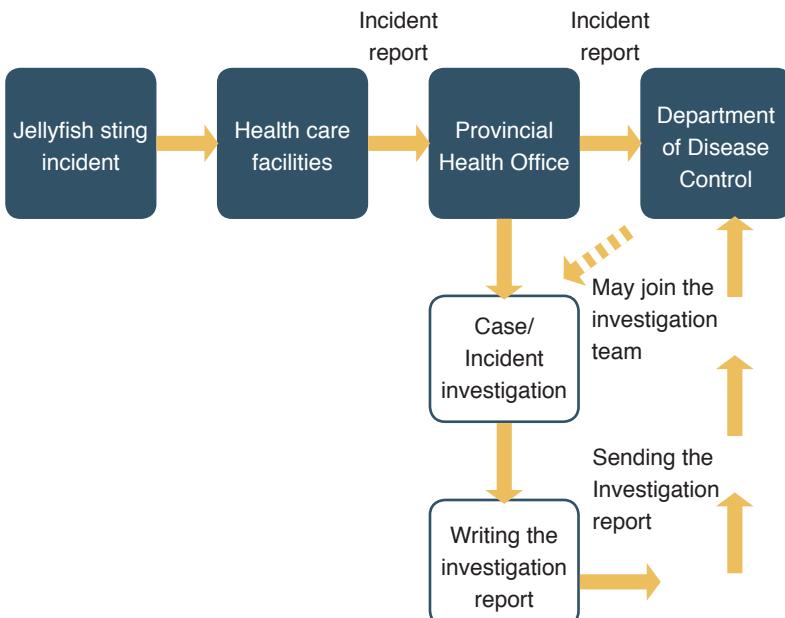
Malaysia



Philippines



Thailand



APPENDICES

Public information pertaining to jellyfish stings and prevention.

Jellyfish Stings: Prevention and Treatment

Chuan Chee Hoe, Balu Alagar Venmathi Maran, Ahmad Khaldun Ismail



Prevention

- ▶ Avoid areas where jellyfish are known to occur.
- ▶ Look out for warning flags and signs, do not enter the water if warnings are present.
- ▶ Wear protective clothing that covers the whole body.



Dangerous Jellyfish Species Identification



Immediate Action Protocol for Jellyfish Sting

Case 1: Sting by *Chironex sp.*



1. Flush the sting site with VINEGAR for 30 seconds to deactivate the undischarged nematocysts on the tentacles, no rubbing.
2. Remove any residual tentacles after applying vinegar.
3. Immediately seek medical treatment.
4. If breathing stops, activate the Emergency Response by calling 999 and initiate CPR until help arrives.

Case 2: Sting by *Physalia physalis*



1. Remove any residual tentacles by carefully rinsing with sea water.
2. NOTE: If you are NOT CERTAIN OF THE JELLYFISH SPECIES, flush or spray vinegar before removing the tentacles.
3. Immediately seek medical treatment, and initiate CPR if breathing stops

Case 3: Other/unknown spp.

1. Flush or spray the sting site with VINEGAR before removing any residual tentacles on the skin.
2. Immediately seek medical treatment.
3. If breathing stops, activate the emergency response by calling 999 and initiate CPR until help arrives.

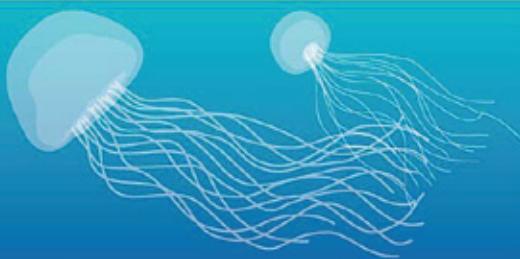
NO FRESH WATER OR ALCOHOL
NO SCRAPING WITH SAND

NO FRESH WATER OR ALCOHOL
NO SCRAPING WITH SAND

NO FRESH WATER OR ALCOHOL
NO SCRAPING WITH SAND

Stop the sting

Box jellyfish stings can cause cardiac and respiratory arrest, aside from excruciating pain. There will be many large red welts on the body where the tentacles struck.



Here are steps a victim should take after a jellyfish attack.



- 1 Get out of the water immediately.

2 Don't scrape the tentacles off with hands or wet sand as this can cause the stinging cells to release more venom into the body.



3 Pour vinegar on the affected area for 30 seconds to stop the stinging cells from releasing the venom.

4 Remove the tentacles from your body using a towel or a tweezer.



- 5 Get medical help as soon as possible.

@The Star Graphics



WHY IT'S STILL IN YOUR KITCHEN?

Evidence showed that vinegar deactivates undischarged jellyfish stingers and may help in saving lives. Bring vinegar with you during beach activities.

Pour/spray vinegar over the affected skin.
Remove the tentacles that are still attached.
Bring to the nearest hospital

EMERGENCY:

MERS 999

Ambulance/ Fire & Rescue/ Civil Defence

RECS MALAYSIA

<http://mstoxinology.blogspot.com/>

NATIONAL POISON CENTER

www.pnc.usm.my



BRING VINEGAR TO THE BEACH CAMPAIGN



> Box jellyfish is believed to be the main jellyfish infesting the Tanjung Aru beach area.

> Square shaped (18cm in size) with tentacles that can extend up to five metres from its four corners and thrives in warm waters.

> Venom could be fatal for adults with existing medical conditions like heart problems and could be severe for young children.

If stung, what to do?

> Immediately get out of the water and apply vinegar as it is deactivates the stinger cells.



> Experts advise avoiding the use of lime or even urine as it could activate stinger cells.



> Seek further medical treatment if necessary.



JANGAN TINGGALKAN DI DAPUR!

Ia tak semanis senyuman anda **TETAPI**:
Kajian membuktikan bahawa rawatan awal menggunakan cuka bagi sengatan obor-obor mampu menyelamatkan nyawa anda.....

Curahkan cuka ke atas tentakel obor-obor dan kulit yang disengat SEBELUM menanggalkan tentakel obor-obor yang melekat...

KECEMASAN:

KECEMASAN 999 | RECS MALAYSIA | PUSAT RACUN NEGARA
www.rcs.org.my | rcsmalaysia.blogspot.com | www.prn.gov.my

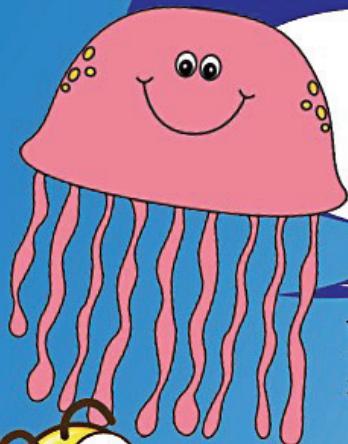


KEMPEN BAWA CUKA KE PANTAI

**Bring Vinegar to the Beach (BVB)
Campaign**



JELLYFISH STING :



DOS & DON'TS



DOS

- ✓ Pour vinegar over affected area/skin and let it soak for at least 30 seconds
- ✓ Remove remaining visible tentacles on the skin (best with tweezers/gloved hands)
- ✓ Bring to the emergency department as soon as possible



DON'TS

- ✗ Wash with fresh water
- ✗ Pour alcohol or urine
- ✗ Apply any gel, ointment or cream
- ✗ Scrub with sand or stone
- ✗ Immerse in cold or hot water
- ✗ Go to a shamen or tantric

HELPLINE:

EMERGENCY 999
(Ambulance / Fire Rescue / APAM)

RECS MALAYSIA
<http://mstoxinology.blogspot.my>

NATIONAL POISON CENTRE
www.prc.usm.my



PREVENTION

is

BETTER

than

CURE

(PBC)

Appropriate Safety Seeking Behaviour
(ASSB)

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