HONG KONG DROWNING REPORT

Based on review of records registered between 2012 and 2016 to the Coroner's Court

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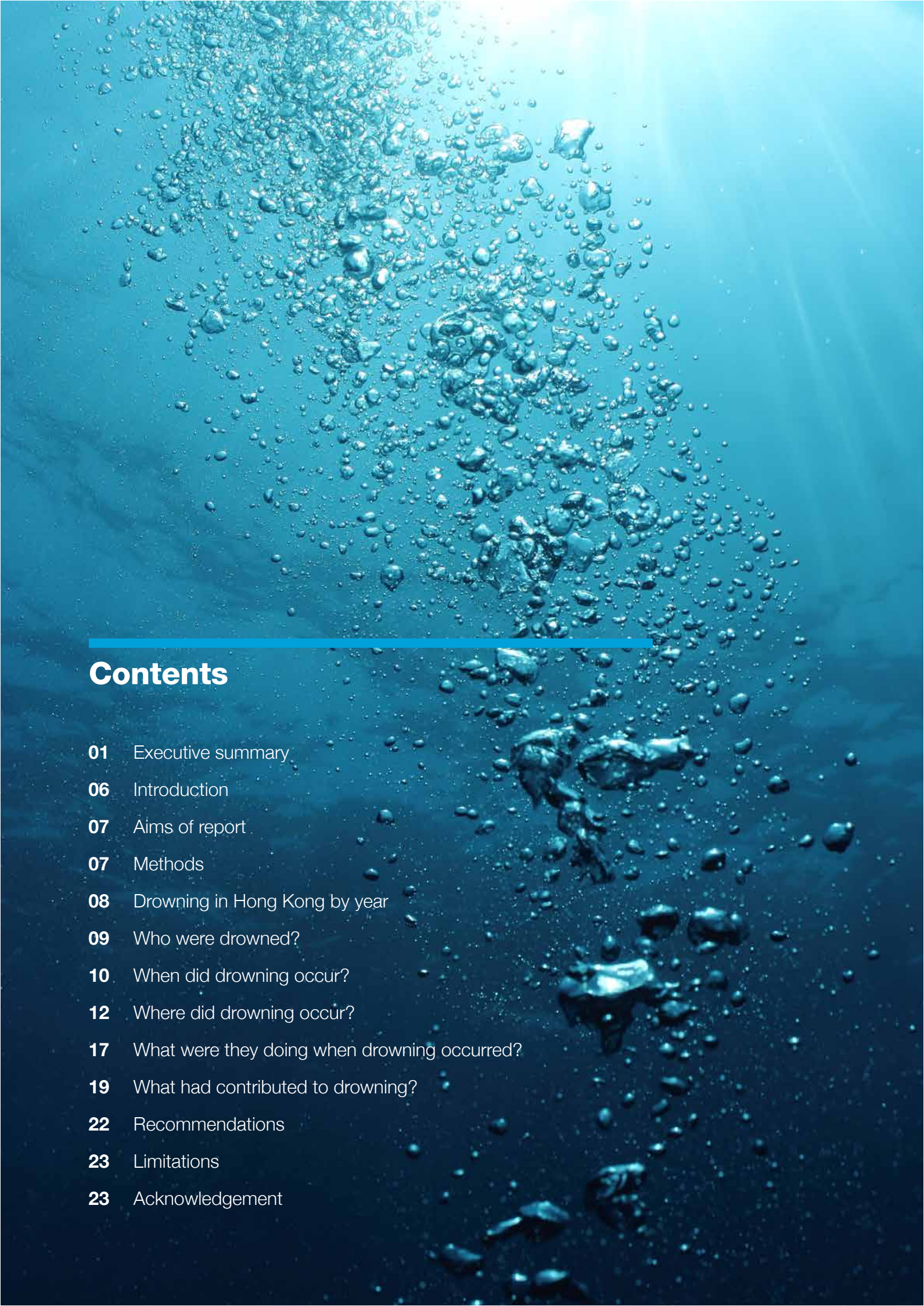

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Executive summary

In accordance with the recommendation of the Action Plan to Strengthen Prevention of Unintentional Injuries in Hong Kong (the Action Plan) published in 2015, the Department of Health (DH) conducted a review of records kept by the Coroner's Court and analysed data on unintentional drowning cases in the years 2012 to 2016 with an aim of understanding the demographic details and factors contributing to drowning incidents in order that appropriate preventive actions could be taken. Data collection was carried out between March 2017 and August 2017 with information extracted and coded by officers with public health knowledge according to a pre-designed coding list based on the International Classification of External Causes of Injuries (ICECI).

Key findings:

1 **Swimming, snorkeling and diving accounted for around half of the drowning cases. Besides, there are some other circumstances with risk of drowning that might have been overlooked, such as accidental immersion, domestic activities and fishing**

2 **Risky behaviours identified in drowning victims**

- Performed water activities under adverse weather conditions
- Performed water activities alone
- Swam in the absence of a lifeguard
- Consumed alcohol before water activities
- Took illicit drugs before water activities

Who?

In 2012-2016, there were 193 unintentional drowning cases registered to the Coroner's Court. The age of death ranged from 5 to 90. The median age of fatalities was 57 years (56 years for male and 64 years for female). A male preponderance was noted (142 cases, 73.6%).

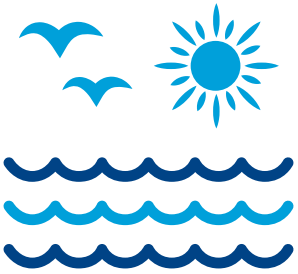
73.6%

Male

median age of fatalities was 56 for male and 64 for female

Where?

Concerning drowning locations, 72 (37.3%) drowning deaths occurred offshore, 59 (30.6%) at beaches and 24 (12.4%) in swimming pools, 14 (7.2%) at home, 8 (4.1%) in river/stream, 5 (2.6%) in inland still water such as pond, 4 (2.1%) in other locations including countryside, sports and athletics area, the location was unknown in 7 cases (3.6%).



37.3%

72 out of 193 drowning deaths occurred offshore

What were they doing?

For activities undertaken immediately prior to drowning, 89 (46.1%) had engaged in swimming, 42 cases (21.8%) were related to accidental immersion, 13 cases (6.7%) had performed domestic activities (e.g. bathing/washing), 10 cases (5.2%) were in underwater activities such as diving and snorkeling, 9 cases (4.7%) were in water-based fishing, 5 cases (2.6%) were in land-based fishing, 4 cases (2.1%) were in water-based food gathering (e.g. clam collection), 12 cases (6.2%) were in other activities and 9 cases (4.7%) were in unknown activities.

46.1%

89 out of 193 drowning deaths had engaged in swimming

What have we overlooked?

It is generally acknowledged that prevention of drowning ties in with safety of water activities. However, this report identified some other factors contributing to drowning that might have been overlooked. For instance, drowning at home took 14 lives (7.3% out of 193 drowning episodes), of which 6 were caused by merely a bucket of water. Another 4 cases were related to water-based food gathering in which sudden change of tide level should be observed.

7.3%

14 out of 193 drowning deaths occurred at home

Alcohol and illicit drugs

Besides, in 2012-2016, among the 136 fatalities with autopsy and alcohol level analysis performed, 38 victims (27.9%) had alcohol detected in their bodies.

Other than alcohol, among the 154 fatalities who had autopsy and drug analysis performed, 57 (37.0%) victims had some kind of drugs detected in their bodies. Analysis revealed presence of illicit drugs in 14 out of 57 (24.6%) fatalities, among them 10 also consumed alcohol. Examples of illicit drugs included ketamine, methamphetamine and cocaine. The 14 deceased aged between 22 and 62, with a mean age of 41.1. Unlike the other drowning cases, majority (64.3%) of these 14 cases were not engaged in water activities at the time of drowning. The locations of drowning of these 14 cases were scattered (e.g. beach, river, pier, home, etc.).

27.9%

38 drowning deaths had alcohol detected in their body*

* among the 136 fatalities with autopsy and alcohol level analysis performed

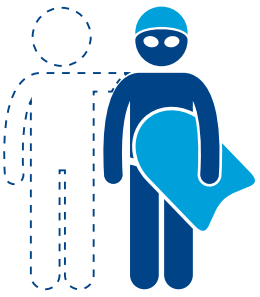
9.1%

14 drowning deaths had illicit drugs detected in their body#

among the 154 fatalities who had autopsy and drug analysis performed

Alone

A total of 104 out of 193 drowning deaths were known to be alone at the time of the incident, accounting for 53.9% of all drowning cases.



53.9%

104 out of 193 drowning deaths were known to be alone at the time of drowning

Recommendations

To keep members of the community safe and free from drowning, the following is recommended:

For the general public:

Enhance your knowledge and skills on water safety

- ✓ Learn how to swim
- ✓ Learn cardiopulmonary resuscitation (CPR) for drowning victims[1], which is different to that for cases of cardiac arrest[2]

Prevent domestic drowning

- ✓ Know the hazards. Domestic drowning hazards can be subtle, even a bucket of water can cause drowning. Be aware of potential risks
- ✓ Be alert, if any member of the family is prone to falling or fainting, their situation can result in drowning
- ✓ Pay attention to family members at home, in particular children, elderly persons and family members who need special care

For persons engaging in water activities:

Be prepared

- ✓ Understand your own ability, acquire the skills required for specific water activities and equip yourself with suitable protective gear
- ✓ Consult a doctor regarding your own fitness for engaging in the water activities if you have a medical condition
- ✓ Avoid consuming alcohol
- ✓ Do not take illicit drugs
- ✓ Be accompanied

Know the environment

- ✓ Avoid water activities during adverse weather conditions especially when a weather warning which affects water safety (i.e. a typhoon, thunderstorm, rainstorm, strong monsoon, flooding warning) is issued by the Hong Kong Observatory
- ✓ Know the facilities, surroundings and risks involved
- ✓ Perform water activities in the presence of a lifeguard
- ✓ Check relevant information at the website of Hong Kong Observatory while planning water activities or hiking that will pass by a river or stream

Take care of companions

- ✓ Supervise children and accompany elderly persons

[1] The International Life Saving Federation provides technical guidance on the skills of CPR for drowning victims. Please refer to the document 'MPS-15' in the following URL: https://www.ilsf.org/position-statements/

[2] Szpilman D, Bierens J, Handley A, Orlowski J. Drowning. New England Journal of Medicine. 2012;366(22):2102-2110 [cited in the Global Report on Drowning: Preventing a Leading Killer. 2014. World Health Organization]

Introduction

The World Health Organization (WHO) mentioned that drowning is a serious and neglected public health threat and challenge claiming the lives of 372 000 people a year worldwide, to which Hong Kong is not immune.

Drowning has a huge impact on families, friends and the community. It places a significant burden on society both in terms of direct costs of medical care and the years of life that are lost. Most often, drowning has complex and multiple causes – but they are preventable with simple and coordinated efforts.

Locally, although the number of deaths due to drowning is small as compared with other major types of injuries, the fatality rate is exceptionally high. From 2007 to 2016, for every ten persons admitted to the hospital due to water-transport accident (V90-V94)[3], six ended up in death. In the same period, there were 350 drowning deaths[4], while hospitals only recorded 162 cases of accidental drowning and submersion (W65-W74)[5] as a number of fatal cases due to drowning were sent directly to the public mortuary without the need for hospital admission. This phenomenon is unique for drowning among various types of injuries observed in Hong Kong. In other words, drowning/ near-drowning is more lethal as compared with other causes of injuries. Drowning has one of the highest fatality rates among all injuries. The significant public health impact should not be underestimated.

There were 350 drowning deaths, while hospitals only recorded 162 cases of accidental drowning and submersion as a number of casualties due to drowning were sent directly to the public mortuary without the need for hospital admission.

In accordance with Government's "Promoting Health in Hong Kong: A Strategy Framework for Prevention and Control of Non-communicable Diseases" published in 2008, the Working Group on Injuries (WGI) was set up in 2012 to advise on priority actions for health improvement in the area of injury prevention, and to make recommendations on the development, implementation and evaluation of an action plan for prevention of injuries. After careful consideration of available evidence and the local situation, the WGI published the Action Plan in 2015, highlighting five strategic directions and nine recommendations to strengthen injury prevention in Hong Kong. Consensus was reached by the WGI to focus on four priority areas including drowning given their heavy death toll.

The routine mortality statistics, however, offer little information on the demographic characteristics and mechanisms leading to drowning incidents. The Action Plan recommended, among others, to carry out a review of drowning cases kept by the Coroner's Court, to better understand the demographic details and factors contributing to drowning incidents in order that appropriate prevention actions could be taken. This sets the scene for this, first ever, drowning report in Hong Kong.

It is hoped that with more focused data gathering and analysis, the Hong Kong Drowning Report may shed light on the circumstances leading to unintentional drowning deaths and provide opportunities for better prevention and public education.

[3] The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) is a system used to classify and code diseases. The ICD-10-CM codes V90-V94 refer to water transport accident involving watercraft like passenger ship, fishing boat, yacht, water-skis, canoe, etc.

[4] According to the mortality statistics maintained by DH, there were 350 drowning deaths in Hong Kong between 2007 and 2016, due to accidental drowning and submersion (W65-W74)

[5] The ICD-10-CM codes W65-W74 refer to accidental drowning and submersion, involving bath-tub, swimming pool, natural water, etc.

Aims of report

This report has the following aims:

- To inform the public and relevant stakeholders the size and significance of drowning
- To raise public awareness of safety around water
- To aid the development of injury prevention messages

Methods

Information presented in this report has been collated from the Coroner's Court in Hong Kong. Drowning is defined as the process of experiencing respiratory impairment from submersion/immersion in liquid. All unintentional drowning deaths registered to the Coroner's Court from 2012 to 2016 in Hong Kong were included. Drowning deaths as a result of suicide or homicide were excluded.

Data collection was carried out between March 2017 and August 2017 by reviewing the case files of unintentional drowning cases kept by the Coroner's Court. Normally, each case file contains police report, autopsy report, rescue report, administrative report, etc. Repeated reviews of case files were undertaken where necessary to ascertain certain facts.

Information was extracted, coded independently and cross-checked by two DH officers with public health knowledge according to a pre-designed coding list based on the International Classification of External Causes of Injury (ICECI) developed by the WHO to enable systematic description of how injuries occur. Descriptive free-text entry was recorded if an entry did not belong to the pre-designed codes.

Descriptive statistics were tabulated. Drowning rates were calculated using death statistics from the Coroner's Court, hospital discharges and population data from the Census and Statistics Department. Percentages were presented up to one decimal place and rounded accordingly.

Drowning in Hong Kong by year

There were 193 unintentional drowning deaths in Hong Kong registered to the Coroner's Court during the period 2012 to 2016. During the same period, there were 155 episodes of hospitalization associated with drowning. No obvious trend was observed in the number of drowning deaths while a decreasing trend was observed for episodes of hospitalization throughout this period.

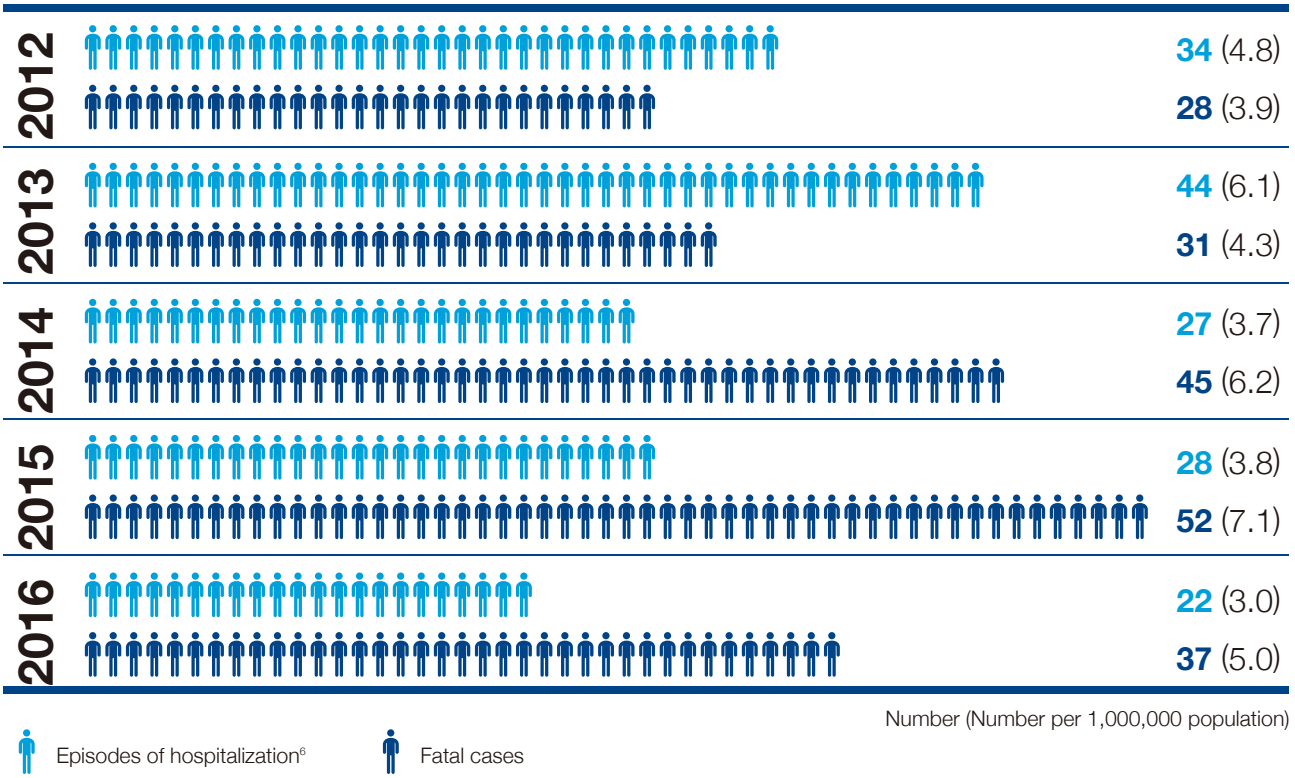


Figure 1. Drowning cases in Hong Kong by year

[6] Episodes of hospitalization refers to episodes of inpatient discharges and deaths kept by the Department of Health

Who were drowned?

Among the 193 drowning cases registered to the Coroner's Court, the median age at death was 57 years (56 years for male and 64 years for female) with a range from 5 to 90. Given the median age of the general population for year 2014 was 42.8[7], this population of drowning fatalities tended to be older and showed a male preponderance. Among these cases, 107 had records of suffering from a pre-existing medical condition, for example, cardiovascular diseases, mental/behavioral disorder, epilepsy, hypertension and diabetes mellitus. These diseases are associated with increased risk of impairment in coordination of movement or conscious level and may be of significance to drowning.

Persons aged 65 or above accounted for the largest proportion of drowning cases that occurred at beaches, in swimming pool, at home and among early morning swimmers. (Please refer to case studies on pages 13-16 for details).

Age group			
Age Groups	Fatality case		Age-specific mortality rate (per 1,000,000 population) [8]
	Fatal	%	
0-14	4	2.1	5.0
15-29	20	10.4	14.8
30-49	41	21.2	17.8
50-64	59	30.6	34.5
65 and above	67	34.7	63.0
Unknown	2	1.0	-

Table 1a. Age distribution of fatalities

Gender			
Sex	Fatal case		Sex-specific mortality rate (per 1,000,000 population) [9]
	Number	%	
Male	142	73.6	42.5
Female	51	26.4	13.1

Table 1b. Sex distribution of fatalities

Pre-existing medical condition		
Characteristics	Fatal case	
	Number	%
Evidence of pre-existing medical condition*	107	55.4
No evidence of pre-existing medical condition*	86	44.6

* Pre-existing medical condition includes cardiovascular diseases, mental/behavioural disorder, epilepsy, hypertension, diabetes mellitus etc.

Table 1c. Characteristics of fatalities

[7] Demographic Statistics Section, Census and Statistics Department

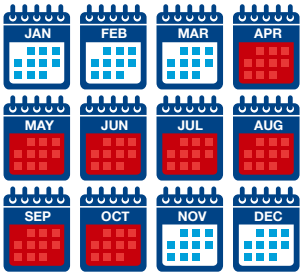
[8] The age-specific mortality rates are compiled by dividing the aggregate number of age-specific drowning deaths during 2012-2016 by the mid-2014 population estimates of the respective age group

[9] The sex-specific mortality rates are compiled by dividing the aggregate number of sex-specific drowning deaths during 2012-2016 by the mid-2014 population estimates of the respective sex

When did drowning occur?

Months of the year

Drowning cases were recorded in all months of the year. Drowning deaths were more common from April to October[10] (4.4 cases per month), and less so from November to March[10] next year (1.6 cases per month).



April to October

4.4

cases per month

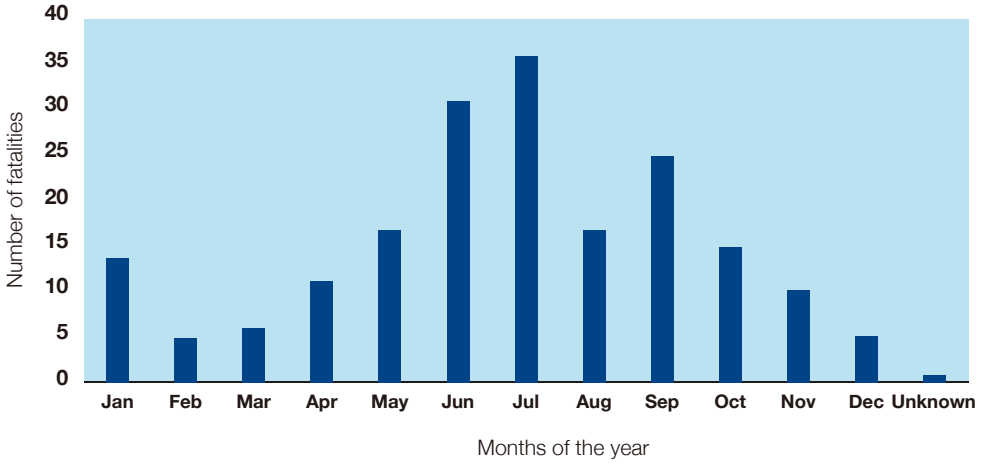
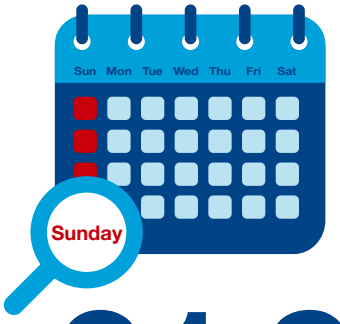


Figure 2. Number of drowning fatalities by month, 2012-2016

Days of the week

Drowning peaked on Sunday (21.8% on Sunday versus an average of 13.0% on other days).



21.8%

on Sunday

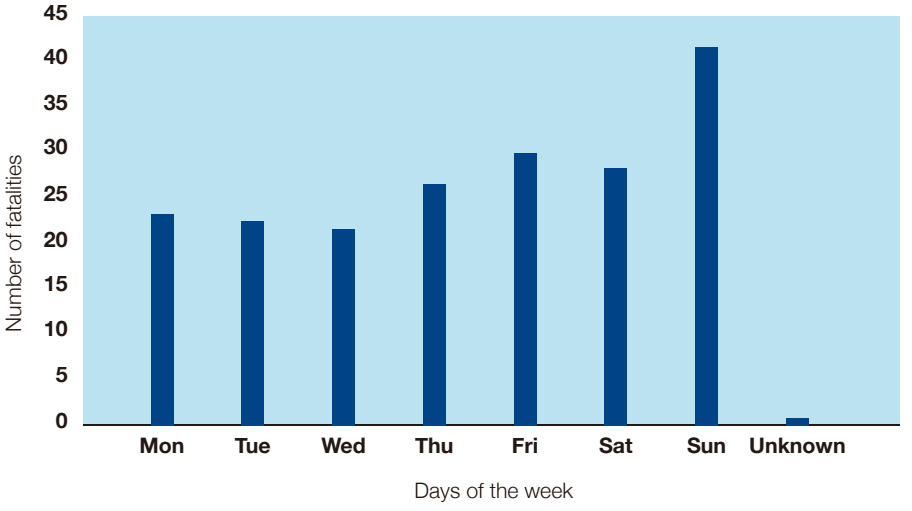


Figure 3. Number of drowning fatalities by day of the week, 2012-2016

[10] April to October and November to March next year are defined by the Leisure and Cultural Services Department (LCSD) as summer and winter months respectively for its management of lifeguard service hours at beaches

Time of the day

Drowning happened round the clock. The peak time period for drowning occurred at 12nn-6pm with 69 deaths (35.8%) recorded, followed by the morning (between 6am and 12nn) with 63 deaths (32.6%) and the evening (between 6pm and 12am) with 33 deaths (17.1%). The time of drowning was unknown in 11 cases (5.7%).

35.8%

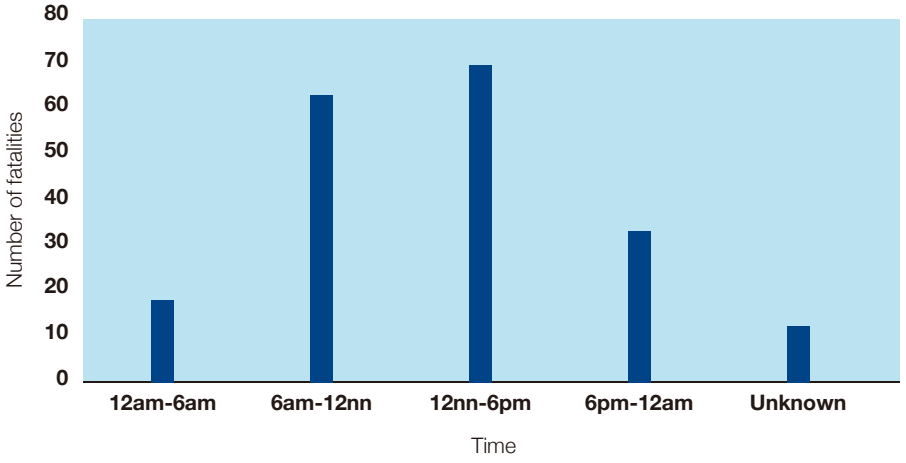


Figure 4. Number of drowning fatalities by time of the day, 2012-2016

Weather

Among the 177 drowning cases occurred outdoor, 84 (47.5%) occurred on a day with adverse weather condition when a weather warning which affects water safety (i.e. a typhoon, thunderstorm, rainstorm, strong monsoon, flooding warning) was issued by the Hong Kong Observatory.

47.5%

during adverse weather

Where did drowning occur?

Out of the 193 drowning cases in 2012-2016, off shore accounted for the highest number of drowning fatality with 72 deaths (37.3%). Beaches recorded 59 deaths (30.6%) from drowning and public/private swimming pools[11] accounted for 24 (12.4%) drowning deaths. Another 14 people (7.3%) drowned in domestic setting.

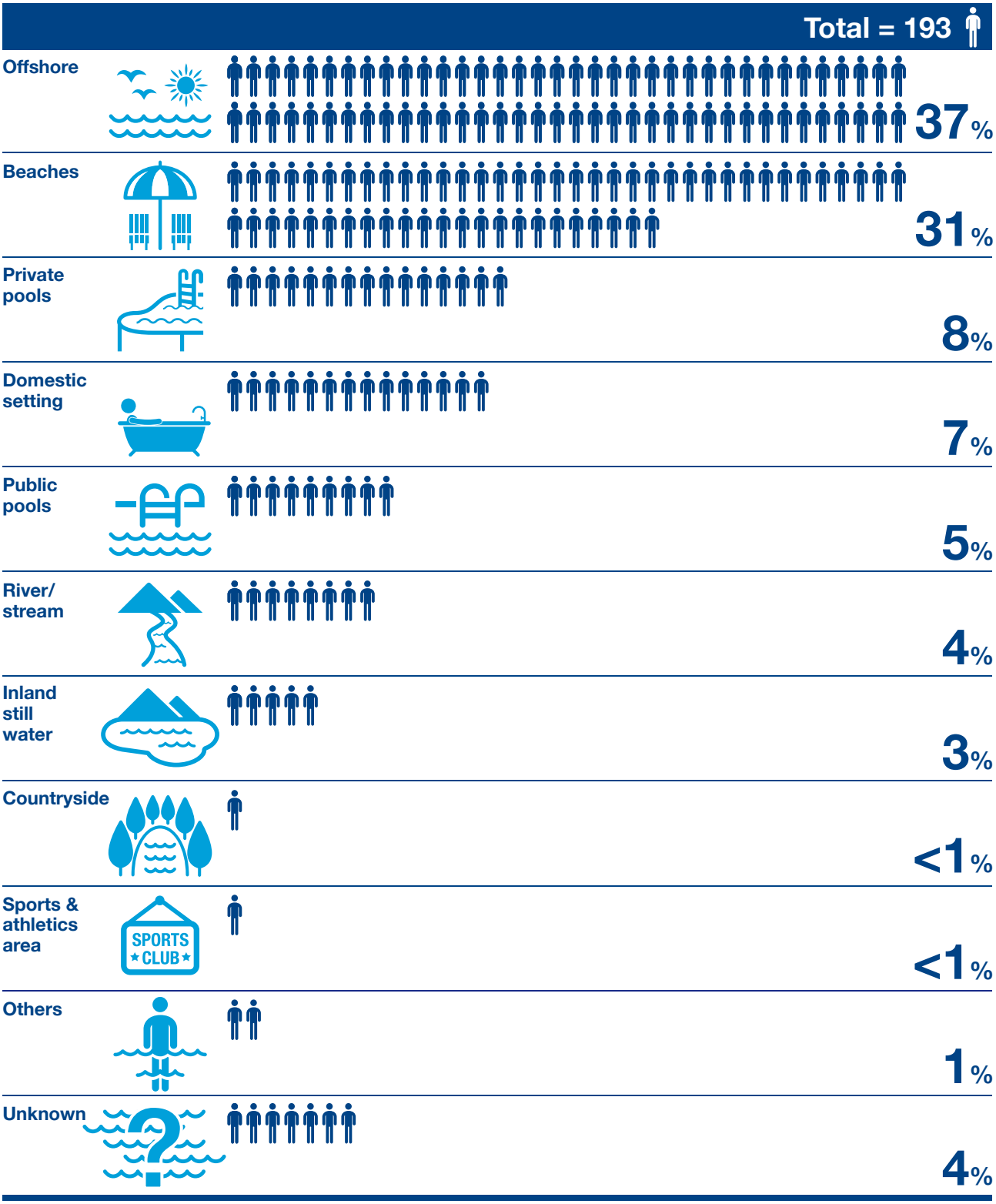


Figure 5. Drowning deaths by location, 2012-2016

[11] Public swimming pools are pools operated by the government. Private swimming pools include those operated by clubs, institutions, associations or other organisations and those serving 20 or more residential units) under the Swimming Pools Regulation (the Regulation) (Cap. 132CA)

CASE STUDY 1:
Drowning at beaches

In 2012-2016, 59 fatal events took place while the victims were swimming at a beach. Further analysis of these events revealed that:

- Among the fatal cases, 1 (1.7%) aged below 15, 8 (13.6%) aged 15-29, 13 (22.0%) aged 30-49, 12 (20.3%) aged 50-64 and 25 (42.4%) aged 65 or above
- There were 39 male victims (66.1%)
- 38 (64.4%) fatal events occurred during weekdays (Monday – Friday) while 21 (35.6%) occurred during weekends (Saturday – Sunday)
- 50 (84.7%) occurred during summer months (April – October; 1.4 cases per month), while 9 (15.3%) occurred during winter months (November – March; 0.4 case per month)
- 6 victims (10.2%) could not swim, 52 (88.1%) could swim to certain degree (among them 2 were highly proficient) while the relevant information on 1 was unavailable. However, only 3 victims (5.1%) had put on a floatation device (among them 2 could not swim)
- 39 events (66.1%) occurred in the absence of lifeguard

CASE STUDY 2:
Drowning in swimming pools

There were 24 fatal events in 2012-2016 while the victims were performing water activities in a swimming pool. A detailed analysis of these events found that:

- Among the deaths, 2 (8.3%) aged below 15, 3 (12.5%) aged 15-29, 1 (4.2%) aged 30-49, 5 (20.8%) aged 50-64 and 13 (54.2%) aged 65 or above
- Males accounted for 17 (70.8%)
- 15 deaths (62.5%) occurred in private swimming pools while 9 deaths (37.5%) occurred in public swimming pools managed by the government
- Lifeguard was reported as available in all (100%) events at the time of occurrence
- 2 victims (8.3%) were not able to swim, none of them had put on a floatation device

CASE STUDY 3:
Early morning swimmers

An in-depth analysis of data was conducted for 22 fatality events among swimmers in the early morning before lifeguard service hours at gazetted public beaches[12]:

- Among them, 0 (0.0%) aged below 15, 2 (9.1%) aged 15-29, 1 (4.5%) aged 30-49, 3 (13.6%) aged 50-64 and 16 (72.7%) aged 65 or above
- For those 16 victims aged 65 or above, 11 (68.8%) were female, 14 (87.5%) had chronic diseases and 13 (81.3%) were alone at the time of drowning
- 17 (77.3%) occurred during weekdays (Monday – Friday) while 5 (22.7%) occurred during weekends (Saturday – Sunday)
- 18 (81.8%) fatal events occurred during summer months (April – October; 0.5 case per month), while 4 (18.2%) occurred during winter months (November – March; 0.2 case per month)
- One victim (4.5%) was unable to swim and did not put on a floatation device

[12] Gazette beaches managed by the Leisure and Cultural Services Department https://www.lcsd.gov.hk/en/beach/index.html

CASE STUDY 4:
Drowning at home

There were 14 drowning events in 2012-2016 which occurred at the victims' home or in a domestic environment. A detailed analysis of these events found that:

- Among the deaths, 1 (7.1%) aged 15-29, 4 (28.6%) aged 30-49, 2 (14.3%) aged 50-64 and 7 (50.0%) aged 65 or above; Mean and median age was 57.3 and 59.0 respectively
- Females accounted for 9 (64.3%)
- 7 (50.0%) victims were drowned in a bathtub, 6 (42.9%) were drowned in a bucket of water
- 11 (78.6%) victims were bathing, 2 (14.3%) were washing clothes
- 12 (85.7%) victims suffered from chronic disease(s)
- 2 (14.3%) victims had consumed alcohol prior to drowning
- 8 (57.1%) victims had consumed drug before the event, among them 3 had consumed illicit drug and 5 had consumed drugs other than illicit drugs

What were they doing when drowning occurred?

Among all drowning cases, 89 people (46.1%) were swimming immediately prior to drowning, 42 people (22%) were immersed in water accidentally (e.g. slipped and fell while drunk or taking selfie) and another 13 people (7%) were engaged in domestic activities (e.g. bathing, washing clothes).

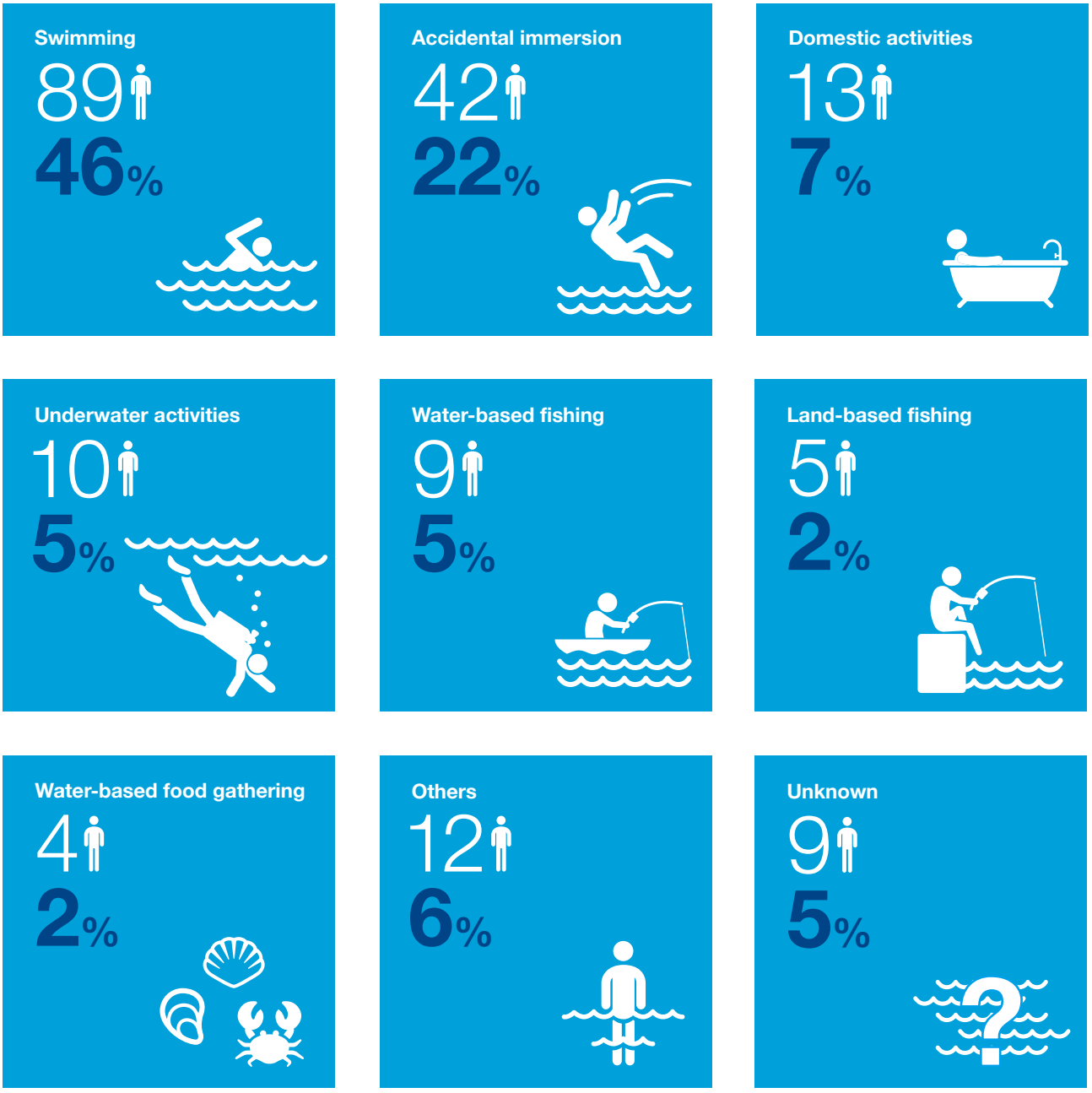


Figure 6. Drowning deaths by activity immediately prior to the event, 2012-2016

CASE STUDY 5:
Drowning deaths related to gathering of food

There were 18 drowning deaths resulting from fishing or food gathering. This represented 8.7% of all drowning deaths. Among the victims, 16 (88.9%) were male and 2 (11.1%) were female. Other key findings were:

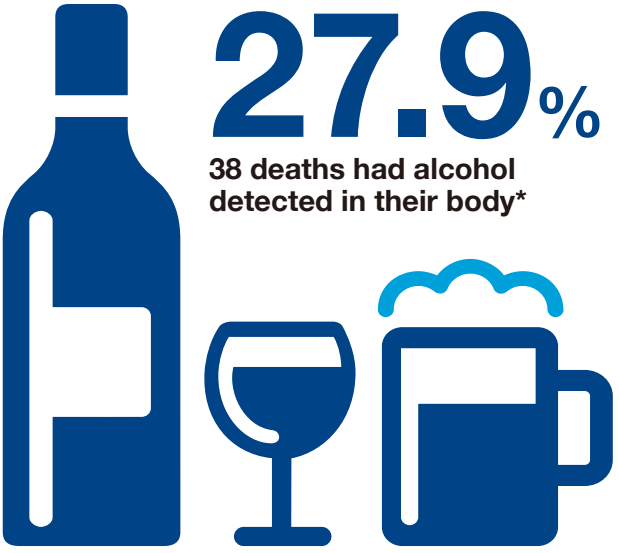
- 9 people (50%) were engaging in water-based fishing, 5 people (27.8%) in land-based fishing, 3 (16.7%) were digging for clams and 1 (5.6%) was collecting seaweed
- 4 (22.2%) deaths were related to occupational food gathering while 14 (77.8%) deaths were not occupational
- 4 (22.2%) victims were not able to swim and only 1 (5.6%) of them used floatation device (life jacket)
- 13 (72.2%) fatal events occurred during weekdays (Monday – Friday) while 5 (27.8%) occurred during weekends (Saturday – Sunday)
- 16 (88.9%) fatal events occurred during summer months (April – October; 0.5 case per month), while 2 (11.1%) occurred during winter months (November – March; 0.1 case per month)

What had contributed to drowning?

Apart from age and sex, certain factors such as prior consumption of drugs and alcohol, and absence of a companion while engaging in water activities, may increase a person's risk of drowning. The following are a few examples.

Alcohol

Alcohol use is a common factor seen in drowning. From 2012 to 2016, among the 136 fatalities with autopsy and alcohol level analysis performed, 38 victims (27.9%) had alcohol detected in their bodies[13]. Among them, 14 (36.8%) had definite history of alcohol consumption prior to drowning and a blood alcohol level of 30mg/100mL or above[14] (a level shown to be affecting judgment and declining visual functions[15]). Six of these 14 cases were drowned because of loss of balance under the influence of alcohol and falling into the water subsequently. The drowning locations of these alcohol-related falls and subsequent drowning included waterfront promenade, pier and boat (during boat party).



	Number of deaths
With alcohol level analysis performed	**136**
• Alcohol detected	38
≥ 10 mg/100ml and < 30 mg/100ml	*24*
≥ 30 mg/100ml	*14*
• Alcohol not detected	98
With no alcohol level analysis performed	**57**
TOTAL	**193**

Table 2. Number of drowning deaths by alcohol analysis results, 2012-2016

* among the 136 fatalities with autopsy and alcohol level analysis performed

Swimming is a sport which has high demand on coordination, judgment, physical ability and response. Consumption of alcohol prior to undertaking water activities is known to increase the risk of drowning as it can impair judgment, result in slow reaction time, impair coordination and result in greater risk-taking behaviors.

[13] Bodily fluid levels ≥10mg/100mL, excluding body cavity fluid, may have been caused by alcohol consumption or post-mortem alcohol production from microbial activities

[14] Bodily fluid levels ≥30mg/100mL, excluding body cavity fluid and with definite history of alcohol consumption

[15] Reference: Paton Alex. Alcohol in the body BMJ 2005; 330: 85

Drug

From 2012 to 2016, among the 154 fatalities who had autopsy and drug analysis performed, 57 (37.0%) drowning victims were found to contain some kind of drugs in their bodies. Analysis revealed presence of illicit drugs in 14 out of 57 (24.6%) fatalities. Examples of illicit drugs included ketamine, methamphetamine and cocaine. In the other 43 (75.4%) victims, medications other than illicit drugs were found in the bodies.

As illicit drugs and certain medications can make people unsteady on their feet, affect bodily functions (e.g. cause water loss from urine) or result in slow response time, they may increase the risk of drowning. Before engaging in water activities, members of the public who are using medications should be fully aware of possible side effects of the medicinal products, not to mention that illicit drugs shall not be used. Moreover, persons who are not feeling well should not engage in water activities.

9.1%

14 deaths had illicit drugs detected in their body out of 154#

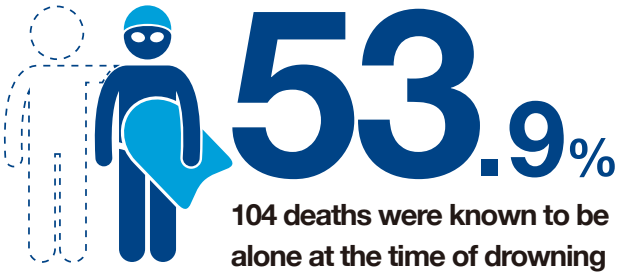
among the 154 fatalities who had autopsy and drug analysis performed

	Number of deaths
With drug level analysis performed	**154**
• Evidence of illicit drugs	14
• Evidence of drugs other than illicit drugs	43
• No drugs detected	97
With no drug level analysis performed	**39**
Total	**193**

Table 3. Number of drowning deaths by drug analysis results, 2012-2016

Alone at the time of drowning

In 104 cases, the drowned person was known to be alone at the time of the event. This accounted for 53.9% of all drowning cases.



Alone at the time of drowning	Number of deaths
Yes	104
No	78
Unknown	11
Total	**193**

Table 4. Number of drowning deaths who were alone at the time of drowning, 2012-2016

Among victims who were known to be alone, 1 (1.0%) aged 0-14, 5 (5.8%) aged 15-29, 14 (13.5%) aged 30-49, 34 (32.7%) aged 50-64 and 49 (47.1%) aged 65 or above while 1 (1.0%) was of unknown age. 71 (68.3%) were male. Among those who were unable to swim, only 1 (1.0%) had put on a floatation device.

Children who are mobile but too young to recognize danger or to get out of water are at risk of drowning, especially in the absence of barriers and capable supervision. For elderly who have an increased drowning risk due to lowered physical endurance, drowning can occur unnoticed without a companion. When a child is placed in or near a water body, he/she should always be supervised at arm's reach. Elderly swimmers are advised to perform water activities with a companion.

Keeping members of the community safe and free from drowning

Recommendations

To keep members of the community safe and free from drowning, the following is recommended:

For the general public

Enhance your knowledge and skills

- Learn how to swim

- Learn cardiopulmonary resuscitation (CPR) for drowning victims[16], which is different to that for cases of cardiac arrest[17]

Prevent domestic drowning

- Domestic drowning hazards can be subtle, even a bucket of water can cause drowning. Be aware of potential risks

- Be alert, if any member of the family is prone to falling or fainting, it can result in drowning

- Supervise children & take extra care for elderly persons and family members who need special care

For persons engaging in water activities

Be prepared

- Understand your own ability, acquire the skills required for specific water activities and equip yourself with suitable protective gear

- Consult a doctor regarding your own fitness for engaging in the water activities if you have a medical condition

- Avoid consuming alcohol

- Do not take illicit drugs

- Be accompanied

Know the environment

- Avoid water activities during adverse weather conditions

- Know the facilities, surroundings and risks involved

- Perform water activities in the presence of a lifeguard

- Check weather information while planning water activities or hiking passes by a river or stream

Take care of companions

- Supervise children and accompany elderly persons

[16] The International Life Saving Federation provides technical guidance on the skills of CPR for drowning victims. Please refer to the document 'MPS-15' in the following URL: https://www.ilsf.org/position-statements/

[17] Szpilman D, Bierens J, Handley A, Orlowski J. Drowning. New England Journal of Medicine. 2012;366(22):2102-2110 [cited in the Global Report on Drowning: Preventing a Leading Killer. 2014. World Health Organization]

Limitations

This is the first study to assess the characteristics and epidemiology of unintentional drowning injuries in Hong Kong. All unintentional drowning deaths that were registered to the Coroner's Court during the study period from 2012 to 2016 were included.

However, as information on drowning deaths has to be collected from proxy respondents/witnesses, there is a potential for information bias.

Besides, autopsy could be waived under certain conditions and as a result, some details (e.g. level of alcohol and drugs in the body) might not be available for some cases. This report mainly provides descriptive epidemiology of drowning cases. In order to understand the comprehensive picture, further studies to examine local implementation of preventive measures would also be helpful to formulate further planning of public education and policy formulation.

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