



INTERNATIONAL LIFE SAVING FEDERATION

ILS Drowning Data and Research Survey

A survey to seeking to explore drowning data collection and analysis for the perspective of International Life Saving Federation membership.

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Contents

EXECUTIVE SUMMARY.....	3
1. INTRODUCTION.....	4
2. OBJECTIVES.....	4
3. BACKGROUND	4
4. METHODS	5
5. CLASSIFICATION OF COUNTRIES BY LEVEL OF DEVELOPMENT	5
6. INCLUSION / EXCLUSION CRITERIA FOR COUNTING COUNTRIES	5
7. FINDINGS.....	5
8. AVAILABILITY OF DROWNING DATA AND TYPE.....	6
9. ACCESS AND REGULAR REPORTING	8
10. DROWNING DEATHS	10
11. WHAT CAN BE COLLECTED.....	12
12. IMPORTANCE FOR PREVENTION STRATEGIES.....	14
13. COLLECT RESUSCITATION OR RESCUE DATA.....	15
14. DISCUSSION	16
Data Quality	17
Data Completeness.....	17
Data comprehensiveness.....	18
Importance for Prevention.....	18
Rescue and Resuscitation Data.....	19
Further Studies.....	19
15. RECOMMENDATIONS	19
16. CONCLUSION	20
Authors:.....	20
Suggested Citation:.....	20
Acknowledgements:.....	20
Reviewers:	20
17. REFERENCES	21
APPENDIX 1. ILS MEMBERS BY REGION (AT 2011).....	22
Africa	22
Americas	22
Asia-Pacific	22
Europe.....	22
APPENDIX 2. RESPONSE TO THE SURVEY BY ILS MEMBERS.....	23
APPENDIX 3 COUNTRY BY INCOME GROUP	24
APPENDIX 4. EXTRA TABLES AND FIGURES.....	26

EXECUTIVE SUMMARY

Drowning is a global public health issue requiring coordinated action and multi-sectoral collaboration for effective prevention. Identifying and analysing the extent of the problem requires comprehensive, complete and quality drowning data. This ILS Drowning Data and Research Survey Report seeks to; explore drowning data collection and analysis from the perspective of the International Life Saving (ILS) federation membership, to identify the barriers to members gaining a greater picture of drowning at national level and to understand how the ILS membership uses data to formulate drowning prevention strategies. It builds upon the previously published ILS World Drowning Report 2007[1] which provided a picture of the size and scope of the drowning problem based on data from 16 ILS members, a summary of the WHO report[2] on drowning deaths using information collected as part of the Global Burden of Disease studies and a review of literature. The ILS World Drowning Report revealed limitations in existing global and regional drowning estimates and identified the need for further research into key issues and interventions.

An online survey was developed, tested and deployed in March 2011 to 107 email addresses taken from the ILS membership contact database. The survey was divided into sections including; availability and type of drowning data, access and reporting, drowning deaths, what it is possible to collect and importance for drowning prevention. There were 55 responses, 37 survey completions and 18 partial completions, covering 45 countries from across all ILS regions. Substantial differences were found between high income country (HIC) and low and middle income country (LMIC) respondents. Ninety six (96%) of HIC respondents reported the availability of drowning data, whilst 22% of LMICs reported having no access to drowning data. ILS members were found to draw national and provincial data principally from Government sources including central government registries, hospitals, coroners and other Government agencies. ILS encourages members to produce national and provincial drowning reports. The survey found that 81% of respondents produced such reports.

Data provided by 24 ILS members was compared against rates published in the World Health Organisation's Global Burden of Disease (GBD) 2008. Although the latter is the only known global dataset and will soon be superseded by the 2010 publication, it has several known limitations and excludes drowning deaths from water transportation and disaster events. The comparison showed substantial differences between ILS member collected data and that presented through the GBD mechanism. In the case of Australia, the ILS member reported figure was 50% higher than the GBD figure, and for the United Kingdom the member figure was 300% higher. Smaller differences, and in some cases figures lower than the GBD figure were also present. The ILS should investigate this area further.

ILS members were found to be collecting data in a range of methodologies for age, locations and activities prior to drowning. This range points to the need for greater uniformity in drowning data standards and definitions. The survey attempted to map the issues that ILS members rate as important for drowning prevention in their areas of responsibility. The responses reflected the principal interests of lifesaving agencies with higher ratings for subjects such as training, public education, standards, lifeguard training and recruitment, and CPR scoring higher than home swimming pools, cold water immersion and tsunami events. This report reinforces the need for ILS members to focus on building their capacity across three dimensions of drowning data; data quality, data completeness and data comprehensiveness. Ideally ILS members would be triangulating drowning data from multiple sources in order to test its quality; however this is often difficult in LMIC settings. ILS members were found to be using media reports to supplement official data and provide case studies. In terms of data completeness, responses dropped away in the older age groupings which may reflect a greater emphasis on child drowning prevention in both HIC and LMIC contexts.

This report makes recommendations for ILS and ILS members whether seeking to improve or commence drowning data collection and analysis. ILS members are encouraged to continue to build capacity to undertake and to understand reports on drowning data. There is evidence that an increasing number of members are using such data to formulate prevention strategies. All members should be encouraged to form partnerships that increase data quality, completeness and comprehensiveness

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ILS DROWNING DATA AND RESEARCH SURVEY

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1. INTRODUCTION

Drowning is global public health issue requiring coordinated action and multi-sectoral collaboration for effective prevention. Identifying and analysing the extent of the problem requires comprehensive, complete and quality drowning data.

This report forms part of a series of ILS reports on the issue of drowning data. It seeks to explore drowning data from the perspective of the ILS membership, to identify the barriers to gaining a more complete picture of drowning at national level and to understand how the membership uses such data to create prevention strategies.

2. OBJECTIVES

The specific objectives are:

- To explore drowning data collection in the ILS member countries.
- To explore the completeness of drowning data in ILS member countries.
- To explore the prioritisation of prevention issues by ILS members.
- To provide guidance and recommendations on future research directions.

3. BACKGROUND

In 2007 ILS released the first ILS World Drowning Report 2007[1]. This report provided a picture of the size and scope of the drowning problem. The methodology included a review of information provided by 16 ILS members, a summary of the WHO report[2] on drowning deaths using information collected as part of Global Burden of Disease studies and a review of literature. Whilst the report illuminated the drowning problem, it revealed limitations in existing global and regional drowning estimates and identified the need for further research into key issues and interventions.

A key objective of the ILS World Drowning Report 2007 was to focus its membership on the collection and analysis of drowning data. Released during the World Water Safety Conference 2007, the report focused attention on the growing recognition of drowning in low and middle income countries (LMIC), and of the strengthening of the role of lifesaving agencies in collecting, analysing and communicating drowning research in high income countries (HIC).

In 2011, the ILS Drowning Prevention Commission undertook the ILS Drowning and Data Survey to map drowning research from the perspective of the ILS membership, and consider key questions including; what is collected?; how is it collected?; how is it used by members?; and how does it influence drowning prevention decision making? It is hoped that this information and analysis will contribute to future editions of the World

Drowning Report, focus further attention on drowning research needs and assist ILS members in growing their research capacity.

4. METHODS

The ILS Drowning Data and Research Survey was developed in December 2010 using the on-line survey tool SurveyMonkey™. The survey was reviewed and piloted by the ILS Research Committee in January 2011; an invitation to participate in the survey was distributed via email to the primary contact of each ILS member and affiliate organisations using the ILS master database of contacts. This email directed recipients to the on-line survey tool.

In cases where an e-mail bounced and the person had a second e-mail address another e-mail was sent to this address, where there was not a second e-mail address but a second contact with an e-mail address was available, they were sent an e-mail. In a small number of cases the primary contact requested that the survey be sent to a second contact (different e-mail address).

In total the survey was sent to 107 e-mail addresses. The survey closed on 28 March 2011 and there were 55 responses. The information was then downloaded into an excel spread sheet and analysis was undertaken in SPSS.

5. CLASSIFICATION OF COUNTRIES BY LEVEL OF DEVELOPMENT

Countries were classified into ILS regions of Africa, Asia-Pacific, Europe and Americas (see . ILS Members by region for full list). Each country was also classified based on World Bank income levels (see Appendix 3 Country by Income group for full list). They were then grouped into High Income Countries (HIC) and Low and Middle Income Countries (LMIC). Note that that Chinese Taipei Water Life Saving Association is an ILS member.

6. INCLUSION / EXCLUSION CRITERIA FOR COUNTING COUNTRIES

There were seven countries where multiple responses were received. In these cases where a single country specific response was required only one of the responses was used e.g. the number of drowning deaths. The response with the most complete detail was chosen.

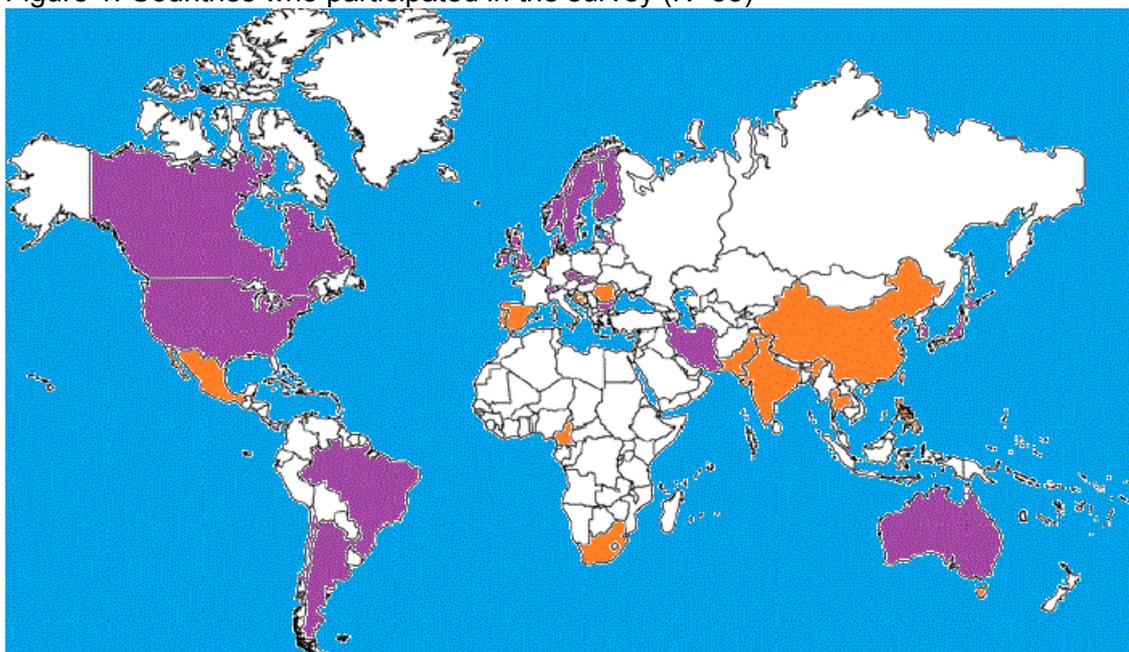
7. FINDINGS

There were 55 responses, 37 survey completions and 18 partial survey completions (i.e. answered only some of the questions). This represented results from 45 countries

The 45 countries came from the following ILS regions: four (4) from Africa, nine (9) from Americas, 12 from Asia-Pacific and 20 from Europe. Of the 45 countries, 27 were high income countries (HIC), 11 upper middle income and seven (7) lower middle income (or 18 low and middle income countries (LMIC)). A complete list of the respondents can be found in

Appendix 2. Response to the survey by ILS Members.

Figure 1. Countries who participated in the survey (N=55)



Purple = provided drowning data.

Orange = participated but did not provide drowning data.

Responses were received from HIC and LMIC perspectives, with the highest to lowest proportion being; Europe 85% HIC, followed by the Americas region 44% HIC, Asia-Pacific 42% HIC and the Africa region 0% HIC (Figure 14).

The results are examined by the following themes:

- Availability of drowning data and type
- Access and regular reporting
- Drowning deaths
- What is possible to collect?
- Importance for drowning prevention

8. AVAILABILITY OF DROWNING DATA AND TYPE

Some form of drowning data was available in 89% of respondent countries (

Table 1). Drowning data was collected in 96% of HIC respondents (all except 1 respondent), and 78% of LMIC respondents. ILS-Europe had the highest rate of available drowning data (95%) and ILS Africa had the lowest with 75% of respondents collecting drowning data.

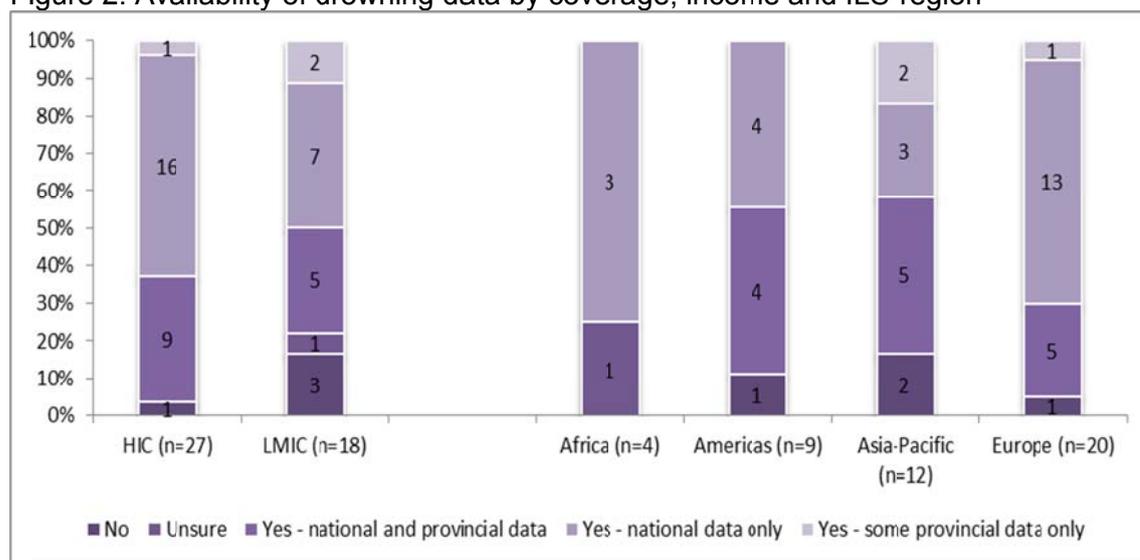
Table 1. Availability of drowning data by income and ILS region

Availability of Drowning Data	HI (n=27)		LMIC (n=18)		Africa (n=4)		Americas (n=9)		Asia-Pacific (n=12)		Europe (n=20)		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Yes	26	96	14	78	3	75	8	89	10	83	19	95	40	89
No / Unsure	1	4	4	22	1	25	1	11	2	17	1	5	5	11
Total	27	100	18	100	4	100	9	100	12	100	20	100	45	100

The respondents were asked to categorize the drowning data into; national data only, national and provincial data, or some provincial data only (Figure 2). In HICs the data collected was predominately (60%) at a national level, although a third of HICs represented (33%) collected both national and provincial data (Figure 2). One HIC respondent collected provincial data only.

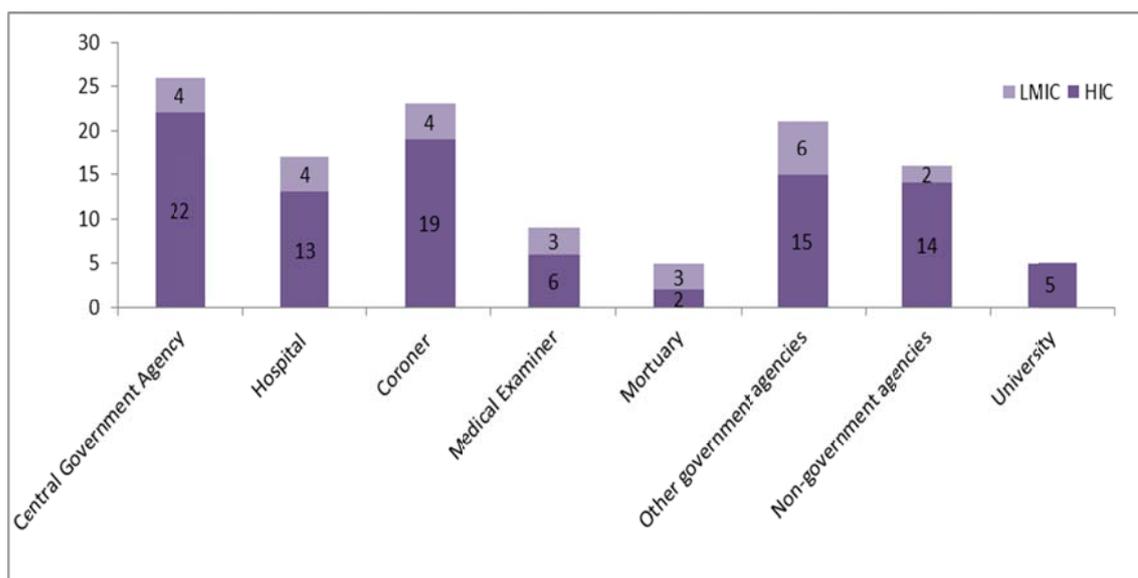
Of the LMIC respondents who collected data, just over a third (39%) collected national data only, over a quarter (28%) collected national and provincial data and two (11%) only collected some provincial data. Note for the purposes of this study the answer 'unsure' was interpreted as 'no'.

Figure 2. Availability of drowning data by coverage, income and ILS region



Drowning information is predominately collected by or from government agencies (Figure 3); the most common being central government agencies (26 countries), coronial systems (23 countries) and other government agencies (21 countries). Other organisations which were identified as also collecting drowning information included; water safety / lifesaving / rescue organisations; army, police and fire departments, and private organisations. The university sector was seen as a source of drowning data in HIC settings only.

Figure 3. Availability of drowning data available by agency by income.



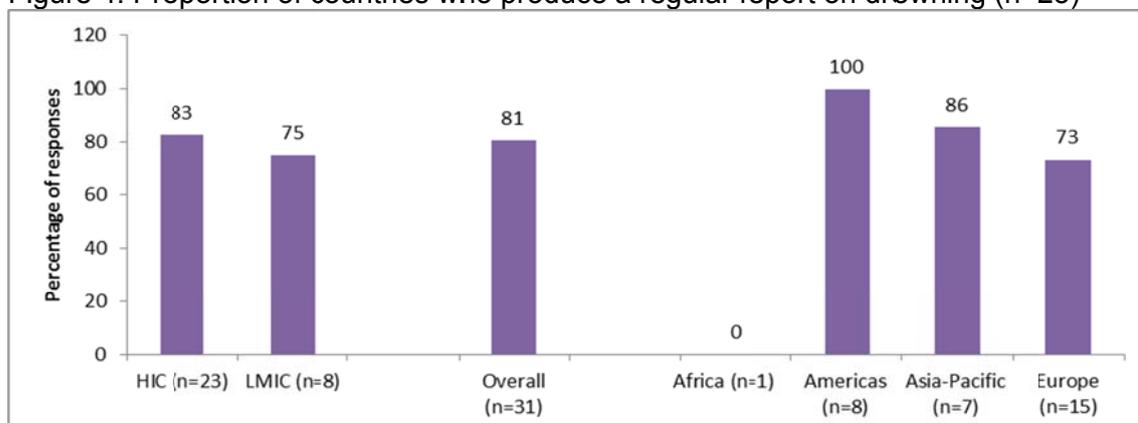
9. ACCESS AND REGULAR REPORTING

The survey asked the question ‘Does your organization use data on fatal drowning in your country / province to plan your drowning prevention and lifesaving activities?’ There were 31 (69%) responses; 26 (84%) answered yes and three (10%) responded that there was no suitable data available. Two respondents stated that their organisation did not undertake drowning prevention and water safety activities. HICs were slightly more likely than LMICs to use the fatal drowning data for planning, as were countries in the ILS Asia-Pacific region.

There were 31 responses to the question; ‘Does your organization access or collect data on fatal drowning in your country / province?’ There were 25 (81%) organisations who had access to or collected data on fatal drowning in their country / province, this is one less than the number of countries who use data on fatal drowning deaths to plan prevention and lifesaving activities. The ILS-Americas region had the highest proportion of responses who answered yes to this question (

Figure 4).

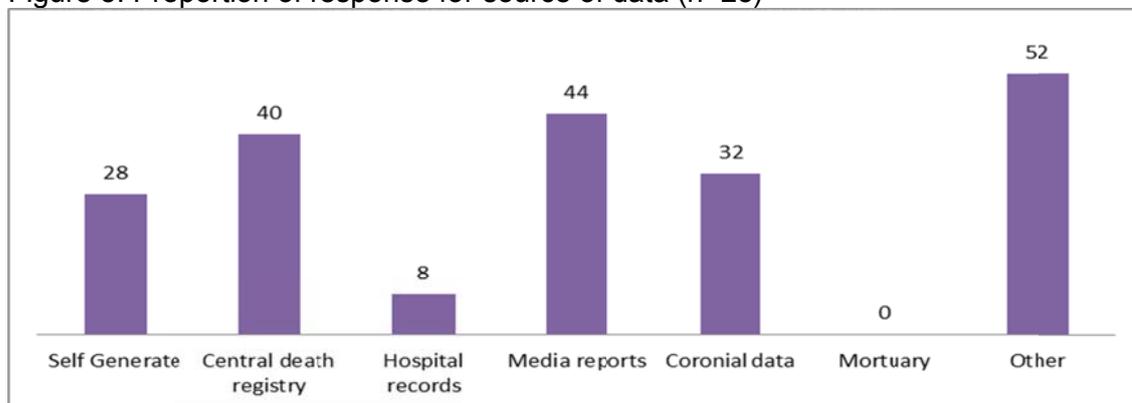
Figure 4. Proportion of countries who produce a regular report on drowning (n=25)



Of the 25 countries represented who had access to data the most common source was media reports (11; 44%) followed by central death registry (40%) (

Figure 5). There were no countries that were using mortuary data. Other sources of data were cited in 13 responses. These included: bureau of statistics; fire-fighter; water rescue; police; government agency; private establishments; lifeguard; coast guard; health department; cause of death publication; army; and search & rescue.

Figure 5. Proportion of response for source of data (n=25)



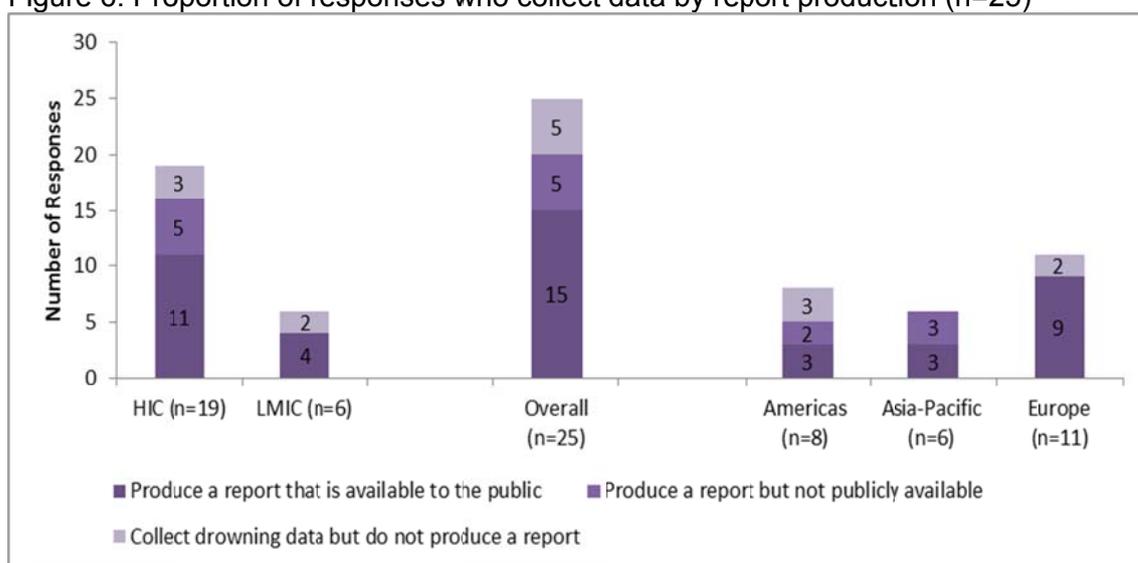
Of the 25 countries who had access to data, the most common type was country wide collections (56%), however, there was variability between regions and HIC and LMIC, for example LMIC most commonly had access to a single report (67%) but did not have access to unit records (Figure 17). The other types of data available included: number of drowning deaths only; media reports collected by a third party and sent to the organisation; police reports; legal medical reports; and intermittent data (i.e. not available every year).

Of the 25 countries who said they collected drowning data, 20 (80%) said that they produced a report on a regular basis (

Figure 4) and of these 15 (75%) made these reports available to the public (

Figure 6). The main way this information is made available to the public is via the internet (50%), media (33%), annual reports and lectures.

Figure 6. Proportion of responses who collect data by report production (n=25)



Drowning rates per 100,000 of population are a more effective method for comparing deaths across age groups, countries and regions than pure numbers. Crude drowning rates were calculated where not provided by respondents. These crude drowning rates for the 24 countries varied from 0.49 in Chile to 8.77 in Latvia. The rate of drowning deaths in Chile is provided by a report from the Chilean army and contrast to the GBD rate of 2.55. The drowning rates are consistently higher than those presented in the GBD figures. This is particularly the case in HICs known to have well developed national drowning reports including Australia, Canada and the United Kingdom.

The reports provided highlighted significant differences in the use of intentional, unintentional and a combination of both. Reports are restricted to unintentional deaths in data provided for Australia, Canada, Chile, Finland, Iran, Japan, Singapore, South Korea, Sweden, Switzerland, Trinidad & Tobago, and United Kingdom. Bulgaria provided data for intentional deaths only, and both unintentional and intentional deaths were provided for Argentina, Barbados, Brazil, Czech Republic, Denmark, Ireland, Latvia, Norway, Saint Lucia, Slovakia, and USA. This makes national and regional comparisons problematic.

The sources of data included Self-Generated; Media Reports; Central Deaths Registry; Coronial Data and Hospital Records. Countries were able to provide more complex data to the survey when data was collected and analysed from a multitude of sources.

Table 2. Reported rate of drowning deaths by Country, ILS Region, Income category, period and source

Country	ILS Region	Cat	Start	Finish	Source	ILS Survey		Data GBD 2008	
						Number *	Crude rate	Number	Crude rate
Argentina	AM	LMIC	01-Jan-2003	31-Dec-2003	CDR - National Health Department Statistics Centre	712	1.83	650	1.63
Australia	AP	HIC	01-Jul-2009	30-Jun-2010	SG; CDR; MR; CD	314	1.41	195	0.93
Barbados	AM	HIC	01-Jan-2010	31-Dec-2010	SG	5	1.85	5	1.85
Brazil	AM	LMIC	01-Jan-2007	31-Dec-2007	CDR	7,009	3.70	6,796	3.54
Bulgaria	EUR	LMIC	01-Jan-2010	31-Dec-2010	SG; CDR; MR	138	1.84	178	2.35
Canada	AM	HIC	01-Jan-2006	31-Dec-2006	CD	508	1.56	258	0.77
Chile a	AM	LMIC	15-Dec-2010	15-Mar-2011	Report Chilean Army	84	0.49	429	2.55
Czech Republic b	EUR	HIC	1-Jan-09	31-Dec-2009	Bureau of Statistics	238	2.27	183	1.77
Denmark	EUR	HIC	01-Jan-2001	31-Dec-2008	SG; CDR; MR	125	2.27	48	0.89
Finland	EUR	HIC	01-Jan-2008	31-Dec-2008	MR; Publication 'Causes of Death' (Official Statistics of Finland) by Statistics Finland	168	3.16	121	2.28
Iran c	AP	LMIC	01-Jan-1989	01-Dec-2010	CD; Lifesavers - disciplinary forces	392	5.65	1,025	1.40
Ireland	EUR	HIC	01-Jan-2009	31-Dec-2010	MR; CD; Police and Central Statistics office	73	1.63	43	0.97

Japan	AP	HIC	01-Jan-2008	31-Dec-2008	SG; Local agencies data, such as the coast guard, police and fire fighting departments	6,464	5.06	6,565	5.16
Latvia	EUR	HIC	01-Jan-2008	31-Dec-2008	MR; CD; Fire fighters data	193	8.77	193	8.54
Norway	EUR	HIC	01-Jan-2009	31-Dec-2009	CDR; HR	135	2.78	43	0.91
Saint Lucia	AM	LMIC	01-Jan-2009	31-Dec-2010	Police Records	6	3.25	8	4.85
Singapore	AP	HIC	01-Jan-2009	31-Dec-2009	CDR; CD; Government agency and private establishments	38	0.76	21	0.46
Slovakia	EUR	HIC	01-Jan-2009	31-Dec-2009	CD; Fire fighters, water rescue, police	120	1.85	177	1.61
South Korea	AP	HIC	01-Jan-2010	31-Dec-2010	CDR	1,247	2.65	776	3.29
Sweden	EUR	HIC	01-Jan-2010	31-Dec-2010	SG; CDR; MR	79	0.88	114	1.23
Switzerland	EUR	HIC	01-Jan-2004	31-Dec-2009	SG; MR	41	0.51	51	0.67
Trinidad & Tobago	AM	HIC	01-Jan-2010	31-Dec-2010	CDR; HR; MR	10	0.91	55	4.09
United Kingdom	EUR	HIC	01-Jan-2005	31-Dec-2006	MR; CD; Search and Rescue, Water Safety, & Police Organizations	704	1.17	233	0.38
USA	AM	HIC	01-Jan-2007	31-Dec-2007	Lifeguard agencies report deaths in their jurisdictions	4,086	1.35	3,599	1.15
Total					Total population across countries GBD 2008 993302886	22,889	2.50	21766	2.19

AM= Americas, AP = Asia-Pacific, Eur = Europe

SG = Self-Generated; MR = Media Reports; CDR = Central Deaths Registry; CD = Coronial Data; HR = Hospital Records

- The number of death reported in GBD 2008 for Chile was 429, at an age adjusted rate of 2.5. Whilst these figures are thought to underestimate drowning in Chile, the figures in the table are unlikely to be accurate.
 - Reporting Date was provided as 1 Dec-2009 to 31 Dec 2009, we believe it should be 1 Jan 2009 to 31 Dec 2009, if dates were correct then the rate would have been 27.18.
 - Population of Iran is 70 million, rate would be 0.32 revised population for the three providences is displayed
 - The number of deaths reported in GBD 2008 was 113 at an age adjusted rate of 0.9.
- * For multiple years an annual average is used

11. WHAT CAN BE COLLECTED

Respondents were asked if they could break down their data by gender, 92% could do this and on average males made up 77% (4.5:1) of all identified drowning victims. However when asked to provide the number of drowning deaths by age group, the proportion of respondents who could do this ranged from 71% in the 0-4 and 5-9 years age group to less than half (46%) for some age groups (

Figure 8). The main reasons given were that data was not analysed in those age groupings or that information was not available in a format that allowed such analysis.

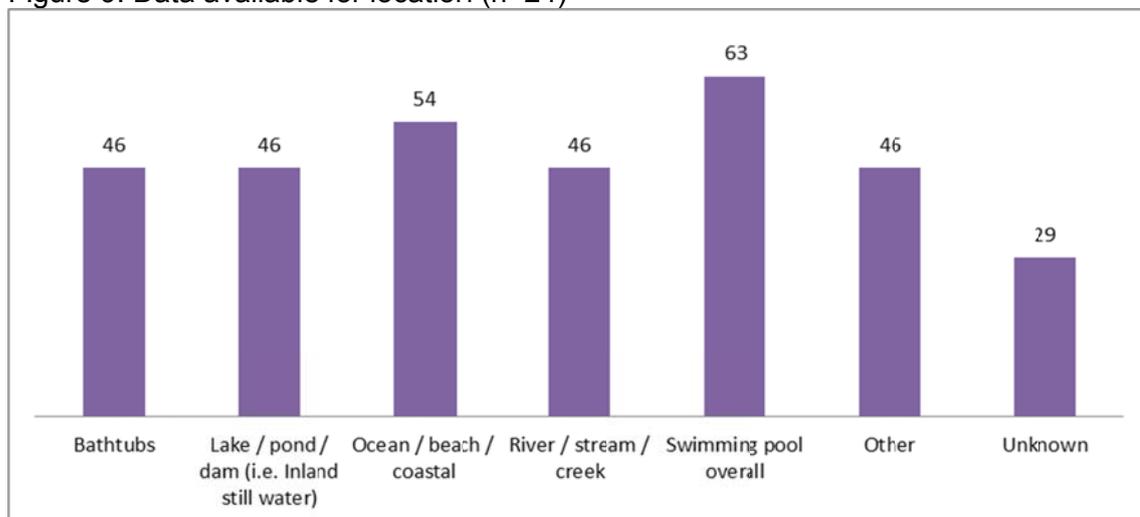
Figure 8. Data available for gender and 5 year age groups (n=24)



There were only two locations where more than 50% of the respondents collected information (

Figure 9). This was identified as being due to people using the international classification of disease coding or the information was not available. It should also be noted that some of the other categories included water transport.

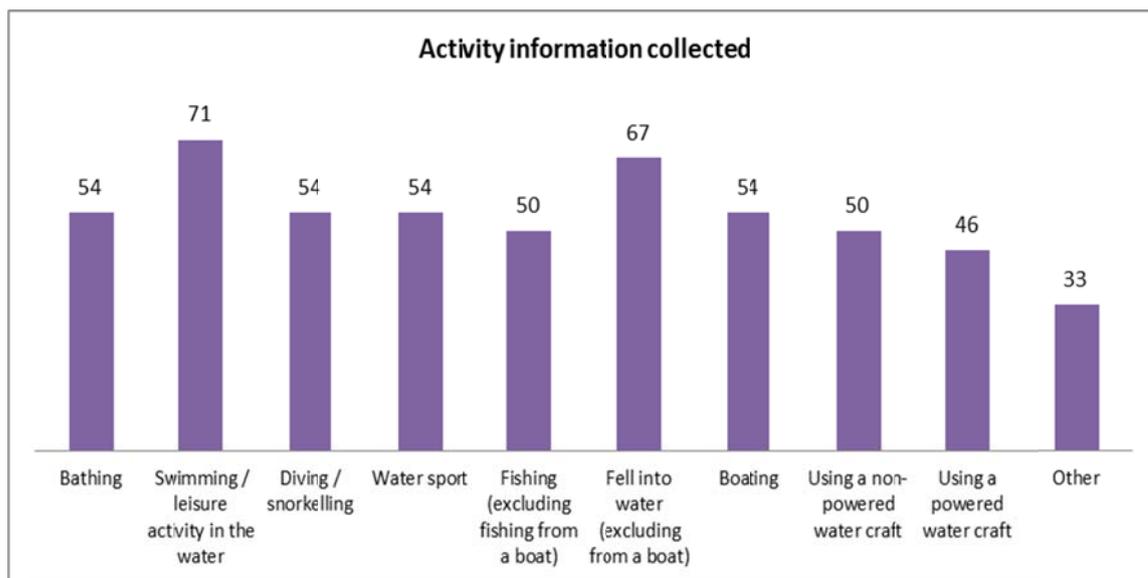
Figure 9. Data available for location (n=24)



The collection of activity information was undertaken by at least half of the respondents (

Figure 10). Other information collected includes environmental conditions, cause of drowning, clothing worn and whether resuscitation was attempted.

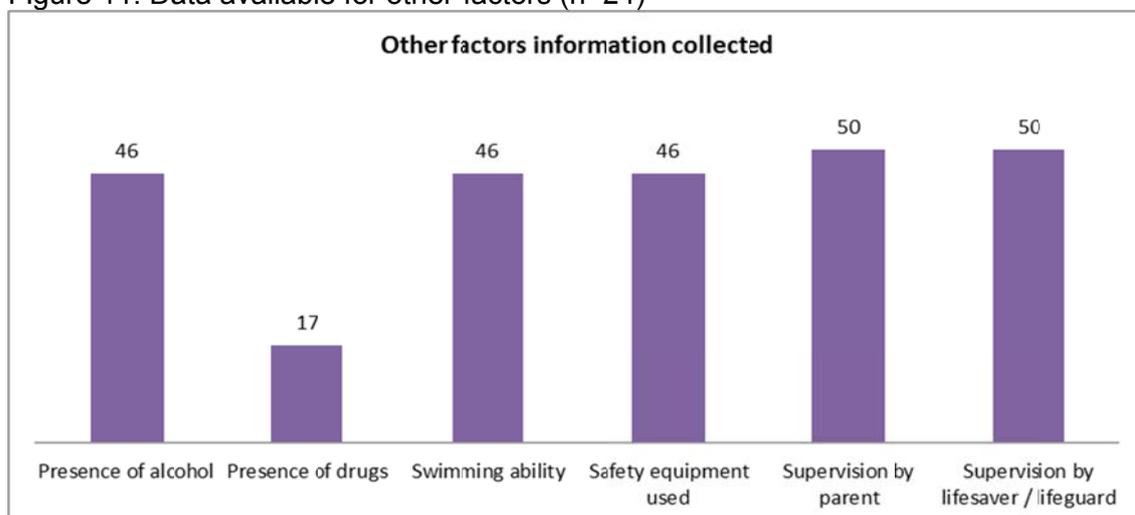
Figure 10. Data available for activity (n=24)



Supervision information (by parent and by lifesaver / lifeguard) was the most commonly collected other factors, the least commonly collected factor was the presence of drugs (

Figure 11).

Figure 11. Data available for other factors (n=24)



12. IMPORTANCE FOR PREVENTION STRATEGIES

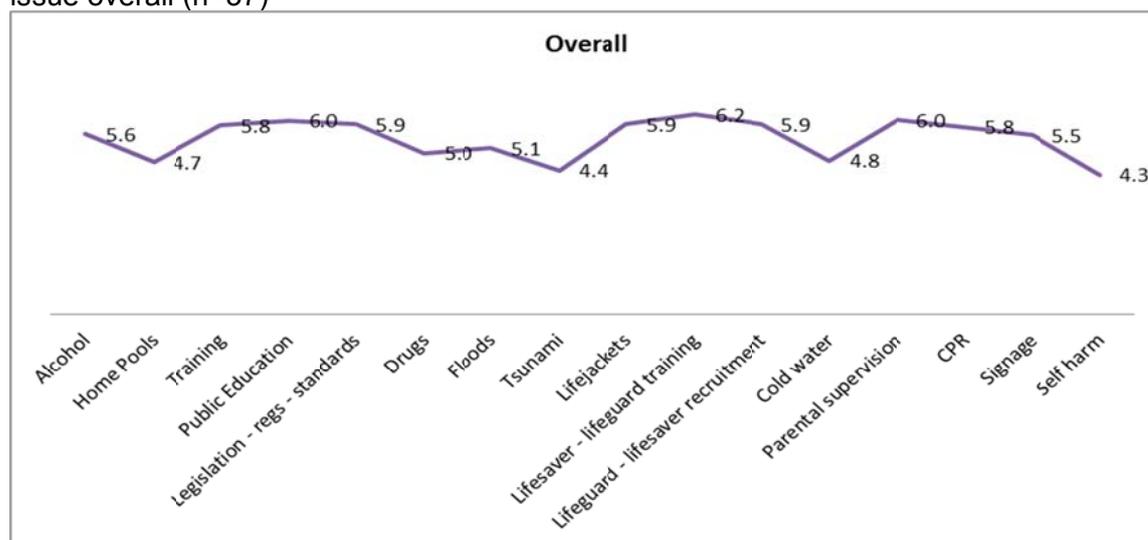
There were 37 responses from 30 countries to the question on ‘how important for drowning prevention are the following issues’. The following summarises the number of responses stating an issue was extremely important: alcohol (32%), home swimming pools (8%), training (32%), public education (51%), legislation / regulations / standards (32%), drugs (8%), floods (11%), Tsunami (3%), lifejackets (35%), lifeguards / lifesaver training (51%), lifesaver / lifeguard recruitment (32%), cold water (11%), parent

supervision (43%), CPR (24%), signage (including flags) (24%), drowning as a method of self-harm (8%).

The issues which were ranked as being more important overall (i.e. scored on average 6 or above) were in order of importance: lifesaver/ lifeguard training; public education; and parental supervision. The issues seen as being least important (scored less than 5) were: Tsunami, home swimming pools, and cold water (

Figure 12). There was no statistical difference between regions or income (Figure 19).

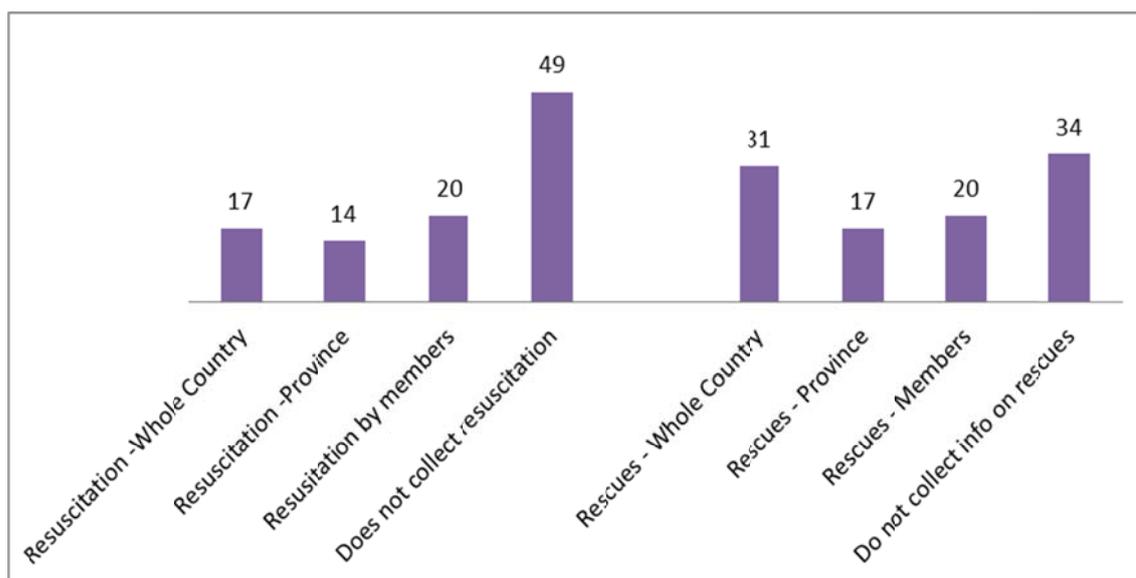
Figure 12. Average importance ranking (7= extremely important to 0 = not an issue) by issue overall (n=37)



13. COLLECT RESUSCITATION OR RESCUE DATA

The survey contained two questions about the collection of data about resuscitation and rescues. There were 35 countries who responded to these questions. For resuscitation just under half (49%) did not collect any information and 20% only collected it where it involved a member. For rescues just under a third (31%) collected lifesaver/lifeguard rescue information for the whole country and a third (34%) did not collect any information. (Figure 13)

Figure 13. Number of countries which collect resuscitation and rescue data by coverage (n=35)



From the responses to the survey it is interesting to note that LMIC were more likely to collect information about resuscitation and rescue than their HIC compatriots (Table 5). There was however very little difference by ILS region.

14. DISCUSSION

The ILS Drowning and Data Survey sought to map drowning research from the perspective of the ILS membership, and consider key questions including; what is collected?; how is it collected?; how is it used by members?; and how does it influence drowning prevention decision making? This information and analysis focused further attention on drowning research needs and assists the ILS membership in growing their research capacity.

A key aspect of this survey was to engage ILS members in the process of drowning data collection, analysis and a consideration of how it is or can be used to inform drowning prevention. In total, there were 55 responses from 45 countries with 24 countries providing drowning data, an increase of eight (50%) countries when compared to the survey distributed as part of the ILS World Drowning Report in 2007. Of the newly contributing countries 6 came from ILS-Europe and 3 from the ILS-Americas. Further, due to the nature of the survey an additional 20 members were able to contribute other drowning prevention information.

The second aspect of this survey was to gain a greater understanding of what drowning information is being collected by ILS members and how it is being collected. The keys to analysis in these areas are the dimensions of data quality, data completeness and data comprehensiveness. A description and example indicators for each dimension is provided in

Table 3.

Table 3. Drowning data dimensions, descriptions and indicators

Dimension	Description	Indicators
Data Quality	<ul style="list-style-type: none"> The degree to which the data can be considered reliable or be trusted. 	<ul style="list-style-type: none"> Robustness of collection methods Source of Data Consistency with other reports

Data Completeness	<ul style="list-style-type: none"> The degree to which the data covers all drowning deaths and provides enough detail on a specified segment(s). 	<ul style="list-style-type: none"> Covers all key age groups Covers drowning by gender Provides for national and provincial analysis
Data Comprehensiveness	<ul style="list-style-type: none"> The degree to which the data can be analysed against key variables and used to make or inform decisions for prevention. 	<ul style="list-style-type: none"> Provides data on drowning location Provides data on activity prior to drowning Provides further variables on risk factors such as presence of alcohol or drugs, pool fences, wearing of life jackets, etc

The research shows that drowning data is being collected by a wide range of organisations including by lifesaving agencies themselves, government agencies and by other organisations and/or private enterprise. This may be seen as both a positive and a negative. On the positive side this allows for the collection and corroboration or validation of data from multiple sources. It may also allow for greater completeness in overall data at a national and provincial level when compared to countries which only rely on a single source or organisation to collect the data. On the negative side, issues such as consistency of coding and quality of the data are of concern. Consistency in coding allows datasets to be combined and compared to increase validation. In the data collected for this report there were some who included intentional deaths, some who excluded intentional deaths and some who only examined intentional deaths. Replication or duplication may also be a concern and lead to unnecessary waste of often limited resources.

Data Quality

Data quality can be subjective in nature and prone to reference against an ideal state of evidence rarely found in drowning research. In an ideal world a triangulation or multiple collection methodologies would be employed to ensure that all drowning cases are collected and analysed. Local level collections would have sufficient processes in place to ensure that all deaths are recorded and are coded in a manner which ensures that none of the data on the essential nature of the drowning incident is lost. Unfortunately this ideal state is only occasionally present in the data collected by ILS members, and almost never the case in collections in LMIC. In HIC settings media reports are often used to supplement detail or locate drowning deaths within official hospital or coronial databases. In LMIC studies using verbal autopsy methodologies are assisting to elucidate the size of the problem and the limitations with the current datasets.

Data Completeness

The completeness of drowning data can be measured by the availability of data by age and sex. Information about sex was collected by 92% of the respondents. There were two issues relating to the age groups requested in the survey, the age groups used and how the data is made available. In the survey 5 year age groupings were used to collect age related information, which resulted in a maximum of 71% of respondents collecting information for the 0-4 and 5-9 years age groups, perhaps a reflection of the interest in child drowning research. Unfortunately the response rate dropped to approximately 50% for adult age groupings. Reasons for these lower levels of response include that while some

respondents may have had drowning data segmented into age groups they may not have fitted neatly into these groupings. How the data is accessed may mean that some ILS members may not have been provided with information about age or may only be provided with a report and not be able to manipulate the data, reflecting a reliance on third party research or drowning reports.

Data comprehensiveness

Comprehensive data is also subjective in nature and for the purpose of this study a very basic measure; location of drowning incident and activity prior to drowning were used to explore the issue. Location is an important aspect of designing prevention programs; the location defines who has access, ownership and types of activities that occur in that setting. The most common location collected was the swimming pool, followed by the ocean / beach / coastal group.

What is clear from the survey is further work is required in developing clear categories of location groupings for use at an international level, it is likely that these groups may be further broken down at a local level to provide greater clarity around the problem and possible solutions.

Activity prior to drowning is often used in conjunction with location to define users at that location and develop prevention strategies. In 71% of responses swimming / leisure activity was collected and fell into water was collected in 67% of cases. There were a number of gaps in the activities provided in this survey, including: where people are swept away due to storms and cataclysmic events; where people intentionally enter the water to drown; or where they were attempting to rescue another person.

The defining of appropriate categories for activity prior to drowning is another area where further work is required by the ILS to develop standard classifications that could be used by countries to code their data or provide to the ILS for international comparisons. The other issues that need to be considered are: what do you do for those occasions where the person was alone when they drowned or there were no witnesses where more than one person drowns; and what do you do where a person is undertaking two activities for example fishing from a canoe.

A further measure of comprehensiveness includes the availability of a wide range of information which organisations may collect to inform deeper questions on drowning prevention. In HIC settings these include the presence of alcohol or drugs, the swimming ability of the person who drowned, the safety equipment being used, and level of supervision. In 50% of responses supervision was being routinely collected, although this survey did not explore exactly what this meant and may be more relevant for some organisations than others. In LMIC settings proximity to household, age of the mother and education of parents.

Importance for Prevention

The third aspect of the survey explored the importance to drowning prevention for a range of issues. The highest response rates were in areas consistent with the mission of many lifesaving organisations i.e. lifesaver training, public education and CPR or key HIC drowning issues such as child supervision and legislation. It

is recommended that future iterations of this survey explore this area in greater depth.

Rescue and Resuscitation Data

The fourth aspect of this survey was to explore resuscitation and rescue information. Given the nature of many ILS members who teach and implement rescue and resuscitation as a component of their drowning prevention strategy, data for each of these areas is collected in less than 51% of cases for resuscitation and in 66% some form of rescue data is collected. The quality, completeness or comprehensiveness of this data was not explored. There is a need for the ILS to explore in greater detail the use of resuscitation in an aquatic setting including quality of intervention and outcomes. While this study focused on deaths future work should be expanded to consider survival from a drowning event (term and inclusion criteria to be explored in greater detail).

Further Studies

Respondents to the survey were asked to identify and provide copies of drowning research or reports to the ILS. Between 45 and 53 reports were identified by the respondents as having been produced about drowning deaths in the last 5 years. These reports ranged from comprehensive national drowning reports produced by lifesaving organisations and government agencies, to examples of published drowning research papers and reports. ILS provides and maintains a database of drowning research on its website.

15. RECOMMENDATIONS

After consideration of the results of this survey the authors make the following recommendations.

ILS should continue to work with its membership and all interested parties to:

1. Ensure that drowning data is collected and reports produced and made publically available in a growing number of countries.
2. Improve the quality, completeness and comprehensive of drowning data.
3. Develop clear and consistent definitions and improved understanding of different collection methods and methodologies to support data comparison across international boundaries.
4. Encourage and share best practice approaches to data collection and analysis.
5. Improve the use of the all forms of data by drowning prevention and lifesaving agencies to identify drowning risk and plan prevention programs. This should also include the development of strategies to increase the evidence base of what works, in what circumstances, requiring what resources.
6. Develop strategies to increase the availability of drowning data, including strengthening its website as a repository for data reports, facilitating drowning research networks and exchanges through conference and workshops.
7. Link, in searchable database format, to externally provided reports on drowning deaths across the world.
8. Use the information contained in this report and that provided by respondents to inform future global and regional drowning estimates.
9. Collaborate to ensure greater consistency in drowning codification across country and specific research studies.

16. CONCLUSION

Drowning as a public health issue suffers greatly from a lack of a strong evidence base in comparison to other causes of mortality of similar or less prevalence. The limitations and exclusions made in official global drowning estimates make the role of lifesaving agencies in collating, analysing and promoting awareness of drowning deaths vitally important. Whilst few ILS members have specialist research capacity, it is acknowledged that all must engage in the process of research, particularly as it relates to analysing the causes of drowning and testing the effectiveness of interventions.

Surveys such as this ILS Drowning Data and Research Survey provide many benefits to ILS and its membership. These benefits include; serving to focus and reinforce an issue, encouraging collaboration across the membership, and providing a basis for recommendations, adjustments to policy and further research. Members are encouraged to consider the findings and recommendation contained within, and take action to strengthen both their role and understanding of the drowning data issues impacting upon their mission to reduce drowning at provincial, national and regional levels.

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Review was sought and received from:

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- Dr Aminur Rahman, Director, International Drowning Research Centre – Bangladesh
- Centre for Injury Prevention and Research - Bangladesh

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APPENDIX 1. ILS MEMBERS BY REGION (AT 2011)

Africa	Americas	Asia-Pacific	Europe
South Africa	Canada	Australia	Austria
Algeria	United States	Bangladesh	Belgium
Seychelles	Argentina	Hong Kong	Bulgaria
Egypt	Brazil	Iran	Czech Republic
Botswana	Jamaica	Japan	Cyprus
Kenya	Saint Lucia	Jordan	Denmark
Mauritius	Trinidad & Tobago	New Zealand	Estonia
Swaziland	Panama	Chinese Taipei	Finland
Lesotho	Mexico	Malaysia	France
Liberia	Chile	Indonesia	Germany
Cameroon	Virgin Islands	India	Great Britain
	Venezuela	Singapore	Ireland
	Peru	Sri Lanka	Italy
	Barbados	Fiji	Netherlands
	Grand Cayman Isl.	Qatar	Norway
	Surinam	China	Poland
	Antigua	Philippines	Portugal
	Costa Rica	South Korea	Slovakia
		Macau	Spain
		Palestine	Sweden
		Pakistan	Hungary
		Kuwait	Greece
		Taiwan	Switzerland
		Syria	Turkey
		United Arab Emirates	Croatia
		Thailand	Macedonia
			Azerbaijan
			Serbia & Montenegro
			Latvia
			Lithuania
			Romania
			Ukraine
			Israel
			Russia
			Slovenia
			Serbia
			Montenegro
			Malta
			Portugal
			Luxembourg
			Iceland
			Andorra

APPENDIX 2. RESPONSE TO THE SURVEY BY ILS MEMBERS

Members (Countries) who responded but did not have drowning data		Members (Countries) who responded and had drowning data	
Austria Bosnia and Herzegovina British Virgin Islands Cameroon China Chinese Taipei Croatia Gibraltar India	Israel Mauritius Mexico Netherlands Pakistan Philippines Portugal Romania South Africa Spain Thailand	Argentina Australia Barbados Brazil Bulgaria Canada Chile Czech Republic Denmark Finland Hong Kong Iran Ireland	Japan Latvia Norway Saint Lucia Singapore Slovakia South Korea Sweden Switzerland Trinidad & Tobago United Kingdom USA
Member (Countries) who did not respond			
Algeria Kenya Jamaica Peru Costa Rica Malaysia Qatar Palestine United Arab Emir. France Hungary Azerbaijan Russia Luxembourg	Seychelles Swaziland Panama Grand Cayman Isl. Bangladesh Indonesia China Kuwait Belgium Germany Greece Serbia & Montenegro Serbia Iceland	Egypt Lesotho Virgin Islands Surinam Jordan Sri Lanka South Korea Taiwan Cyprus Italy Turkey Lithuania Montenegro Andorra	Botswana Liberia Venezuela Antigua New Zealand Fiji Macau Syria Estonia Poland Macedonia Ukraine Malta

APPENDIX 3 COUNTRY BY INCOME GROUP

	Economy	Income group
1	Afghanistan	LI
2	Albania	UMI
3	Algeria	UMI
4	American Samoa	UMI
5	Andorra	HI:
6	Angola	LMI
7	Antigua & Barbuda	UMI
8	Argentina	UMI
9	Armenia	LMI
10	Aruba	HI:
11	Australia	HI: OECD
12	Austria	HI: OECD
13	Azerbaijan	UMI
14	Bahamas, The	HI:
15	Bahrain	HI:
16	Bangladesh	LI
17	Barbados	HI:
18	Belarus	UMI
19	Belgium	HI: OECD
20	Belize	LMI
21	Benin	LI
22	Bermuda	HI:
23	Bhutan	LMI
24	Bolivia	LMI
25	Bosnia Herzegovina	UMI
26	Botswana	UMI
27	Brazil	UMI
28	Brunei Darussalam	HI:
29	Bulgaria	UMI
30	Burkina Faso	LI
31	Burundi	LI
32	Cambodia	LI
33	Cameroon	LMI
34	Canada	HI: OECD
35	Cape Verde	LMI
36	Cayman Islands	HI: non OECD
37	Central African Rep.	LI
38	Chad	LI
39	Channel Islands	HI:
40	Chile	UMI
41	China	LMI
42	Colombia	UMI
43	Comoros	LI
44	Congo, Dem. Rep.	LI
45	Congo, Rep.	LMI
46	Costa Rica	UMI
47	Côte d'Ivoire	LMI
48	Croatia	HI:
49	Cuba	UMI
50	Cyprus	HI:
51	Czech Republic	HI: OECD
52	Denmark	HI: OECD
53	Djibouti	LMI
54	Dominica	UMI

55	Dominican Republic	UMI
56	Ecuador	LMI
57	Egypt	LMI
58	El Salvador	LMI
59	Equatorial Guinea	HI:
60	Eritrea	LI
61	Estonia	HI: OECD
62	Ethiopia	LI
63	Faeroe Islands	HI:
64	Fiji	UMI
65	Finland	HI: OECD
66	France	HI: OECD
67	French Polynesia	HI:
68	Gabon	UMI
69	Gambia, The	LI
70	Georgia	LMI
71	Germany	HI: OECD
72	Ghana	LI
73	Gibraltar	HI:
74	Greece	HI: OECD
75	Greenland	HI:
76	Grenada	UMI
77	Guam	HI:
78	Guatemala	LMI
79	Guinea	LI
80	Guinea-Bissau	LI
81	Guyana	LMI
82	Haiti	LI
83	Honduras	LMI
84	Hong Kong - China	HI:
85	Hungary	HI: OECD
86	Iceland	HI: OECD
87	India	LMI
88	Indonesia	LMI
89	Iran, Islamic Rep.	UMI
90	Iraq	LMI
91	Ireland	HI: OECD
92	Isle of Man	HI:
93	Israel	HI: OECD
94	Italy	HI: OECD
95	Jamaica	UMI
96	Japan	HI: OECD
97	Jordan	LMI
98	Kazakhstan	UMI
99	Kenya	LI
100	Kiribati	LMI
101	Korea, Dem. Rep.	LI
102	Korea, Rep.	HI: OECD
103	Kosovo	LMI
104	Kuwait	HI:
105	Kyrgyz Republic	LI
106	Lao PDR	LI
107	Latvia	HI:
108	Lebanon	UMI
109	Lesotho	LMI

110	Liberia	LI
111	Libya	UMI
112	Liechtenstein	HI:
113	Lithuania	UMI
114	Luxembourg	HI: OECD
115	Macao SAR, China	HI:
116	Macedonia, FYR	UMI
117	Madagascar	LI
118	Malawi	LI
119	Malaysia	UMI
120	Maldives	LMI
121	Mali	LI
122	Malta	HI:
123	Marshall Islands	LMI
124	Mauritania	LI
125	Mauritius	UMI
126	Mayotte	UMI
127	Mexico	UMI
128	Micronesia Fed. Sts.	LMI
129	Moldova	LMI
130	Monaco	HI:
131	Mongolia	LMI
132	Montenegro	UMI
133	Morocco	LMI
134	Mozambique	LI
135	Myanmar	LI
136	Namibia	UMI
137	Nepal	LI
138	Netherlands	HI: OECD
139	Netherlands Antilles	HI:
140	New Caledonia	HI:
141	New Zealand	HI: OECD
142	Nicaragua	LMI
143	Niger	LI
144	Nigeria	LMI
145	Northern Mariana Isl.	HI:
146	Norway	HI: OECD
147	Oman	HI:
148	Pakistan	LMI
149	Palau	UMI
150	Panama	UMI
151	Papua New Guinea	LMI
152	Paraguay	LMI
153	Peru	UMI
154	Philippines	LMI
155	Poland	HI: OECD
156	Portugal	HI: OECD
157	Puerto Rico	HI:
158	Qatar	HI:
159	Romania	UMI
160	Russian Federation	UMI
161	Rwanda	LI
162	Samoa	LMI
163	San Marino	HI:

164	São Tomé & Príncipe	LMI
165	Saudi Arabia	HI:
166	Senegal	LMI
167	Serbia	UMI
168	Seychelles	UMI
169	Sierra Leone	LI
170	Singapore	HI:
171	Slovak Republic	HI: OECD
172	Slovenia	HI: OECD
173	Solomon Islands	LI
174	Somalia	LI
175	South Africa	UMI
176	Spain	HI: OECD
177	Sri Lanka	LMI
178	St. Kitts and Nevis	UMI
179	St. Lucia	UMI
180	St. Vincent & Grenad.	UMI
181	Sudan	LMI
182	Suriname	UMI
183	Swaziland	LMI
184	Sweden	HI: OECD
185	Switzerland	HI: OECD
186	Syrian Arab Republic	LMI
187	Tajikistan	LI
188	Tanzania	LI
189	Thailand	LMI
190	Timor-Leste	LMI
191	Togo	LI
192	Tonga	LMI
193	Trinidad and Tobago	HI:
194	Tunisia	LMI
195	Turkey	UMI
196	Turkmenistan	LMI
197	Turks & Caicos Isl.	HI:
198	Tuvalu	LMI
199	Uganda	LI
200	Ukraine	LMI
201	United Arab Emirates	HI:
202	United Kingdom	HI: OECD
203	United States	HI: OECD
204	Uruguay	UMI
205	Uzbekistan	LMI
206	Vanuatu	LMI
207	Venezuela, RB	UMI
208	Vietnam	LMI
209	Virgin Islands (U.S.)	HI:
210	West Bank and Gaza	LMI
211	Yemen, Rep.	LMI
212	Zambia	LI
213	Zimbabwe	LI

LI = Low Income - LMI = Lower Middle Income - HMI = Higher Middle Income - HI = High Income

APPENDIX 4. EXTRA TABLES AND FIGURES

Figure 14. ILS regions by income

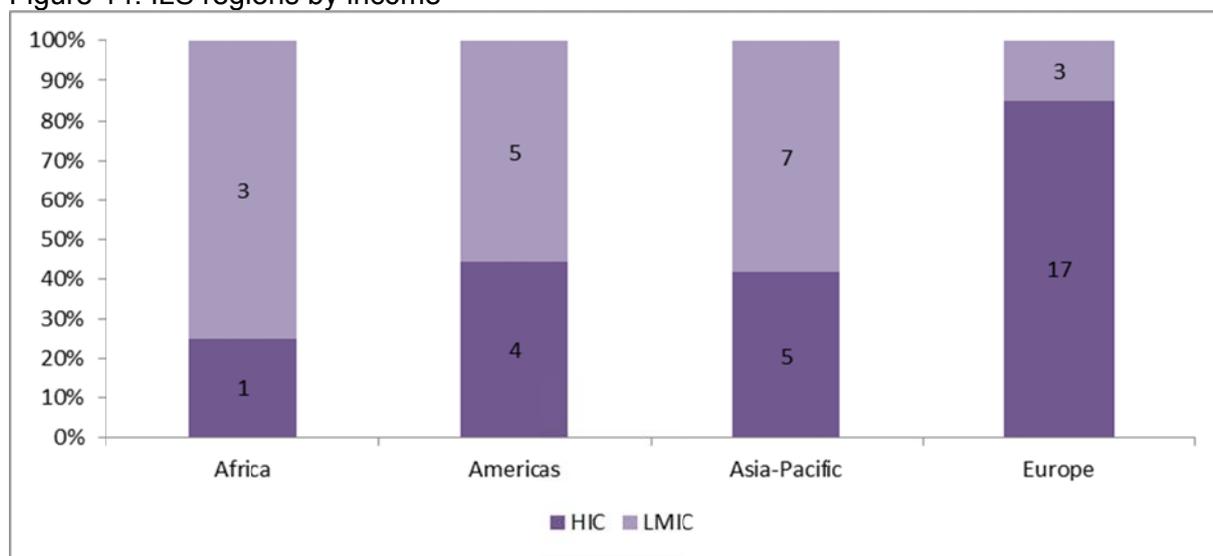


Figure 15. Availability of drowning data by income and ILS regions.

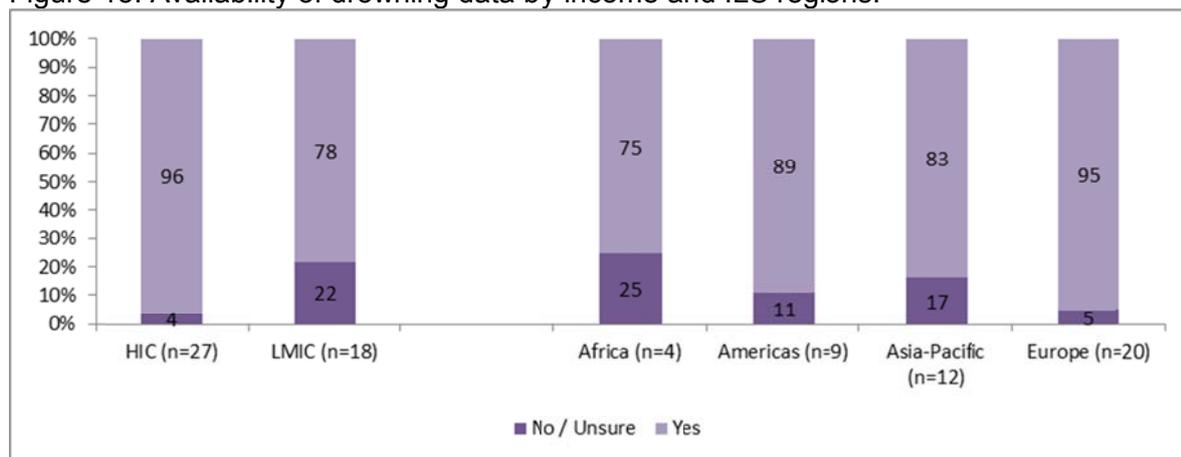


Figure 16. Availability of drowning data by coverage, income and ILS region

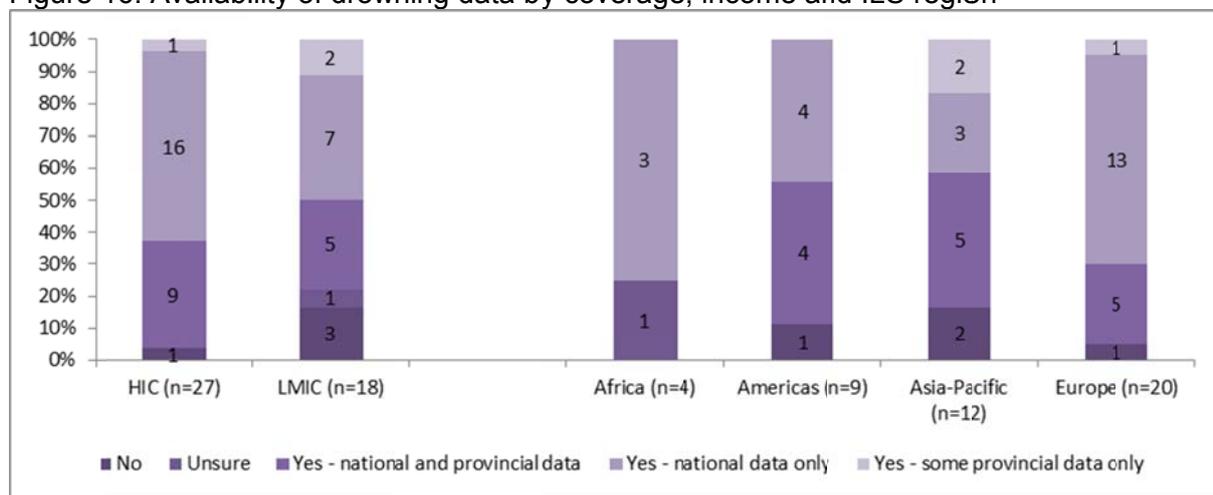


Figure 17. Our organisation does use data on fatal drowning to plan your drowning prevention and lifesaving activities (n=26)

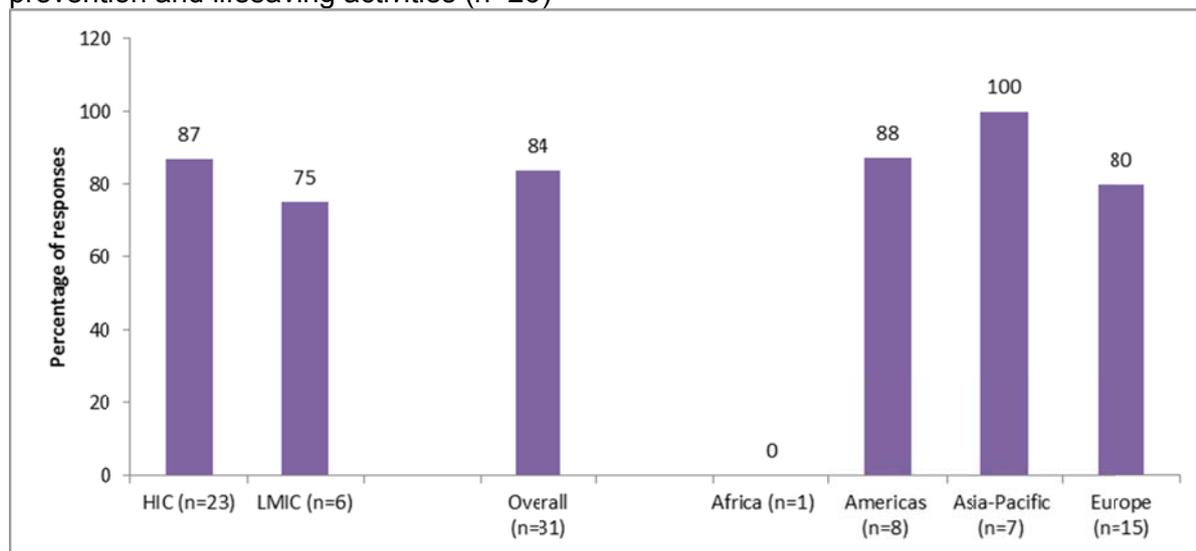


Figure 17. Proportion of response for source of data by income and ILS region (n=25)

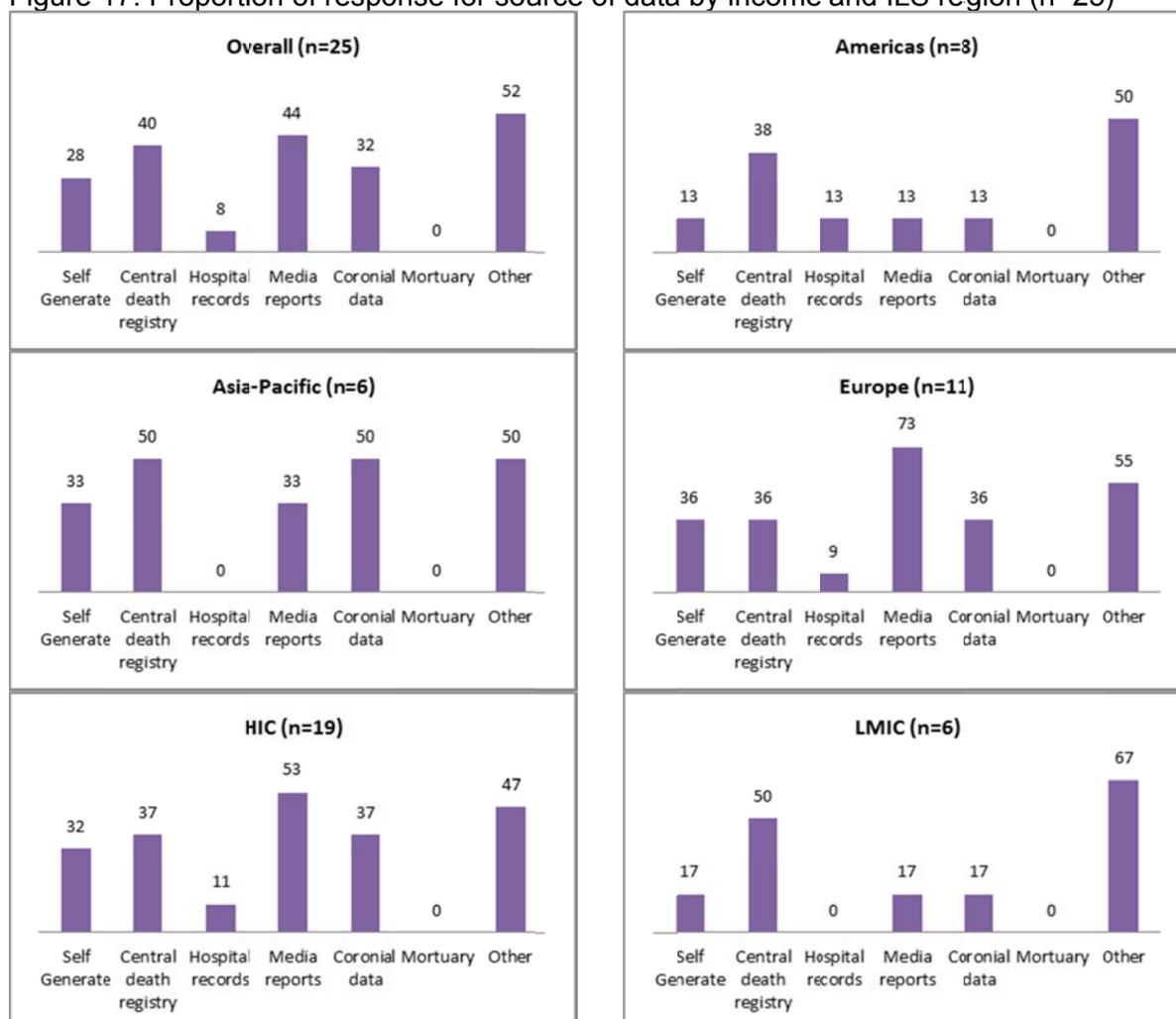


Figure 18. Our organisation does have access to or collect data on fatal drowning in our country / province (n=25)

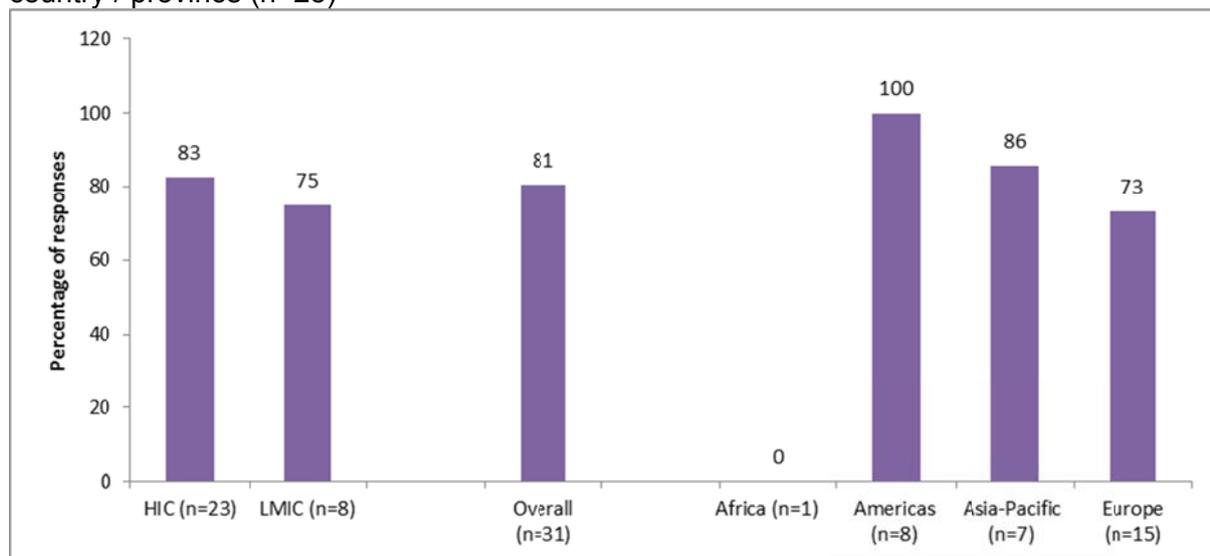


Figure 20. Proportion of response for type of data accessible by income and ILS region (n=25)

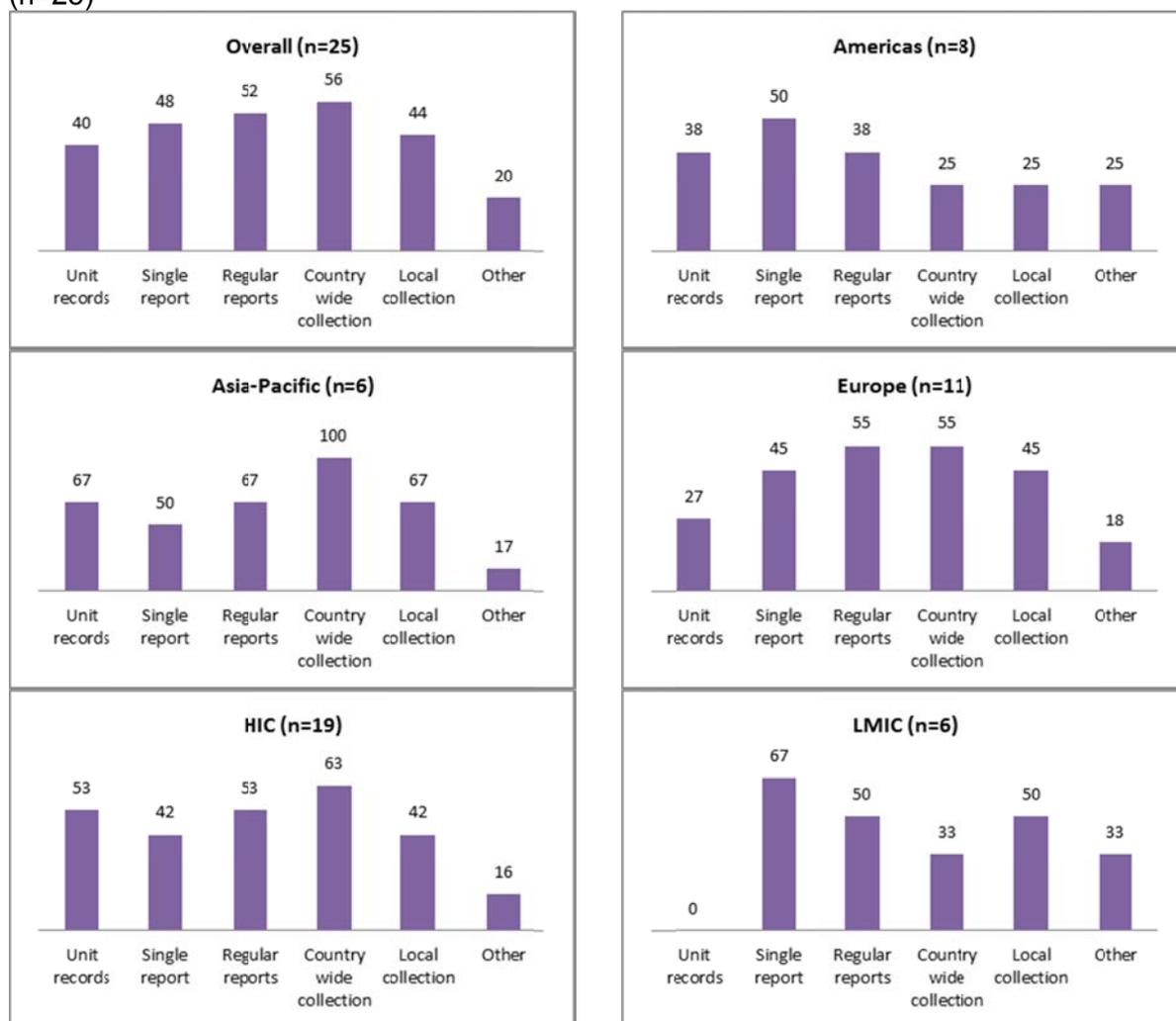


Figure 19. Average importance ranking (7= extremely important to 0 = not an issue) by region and income

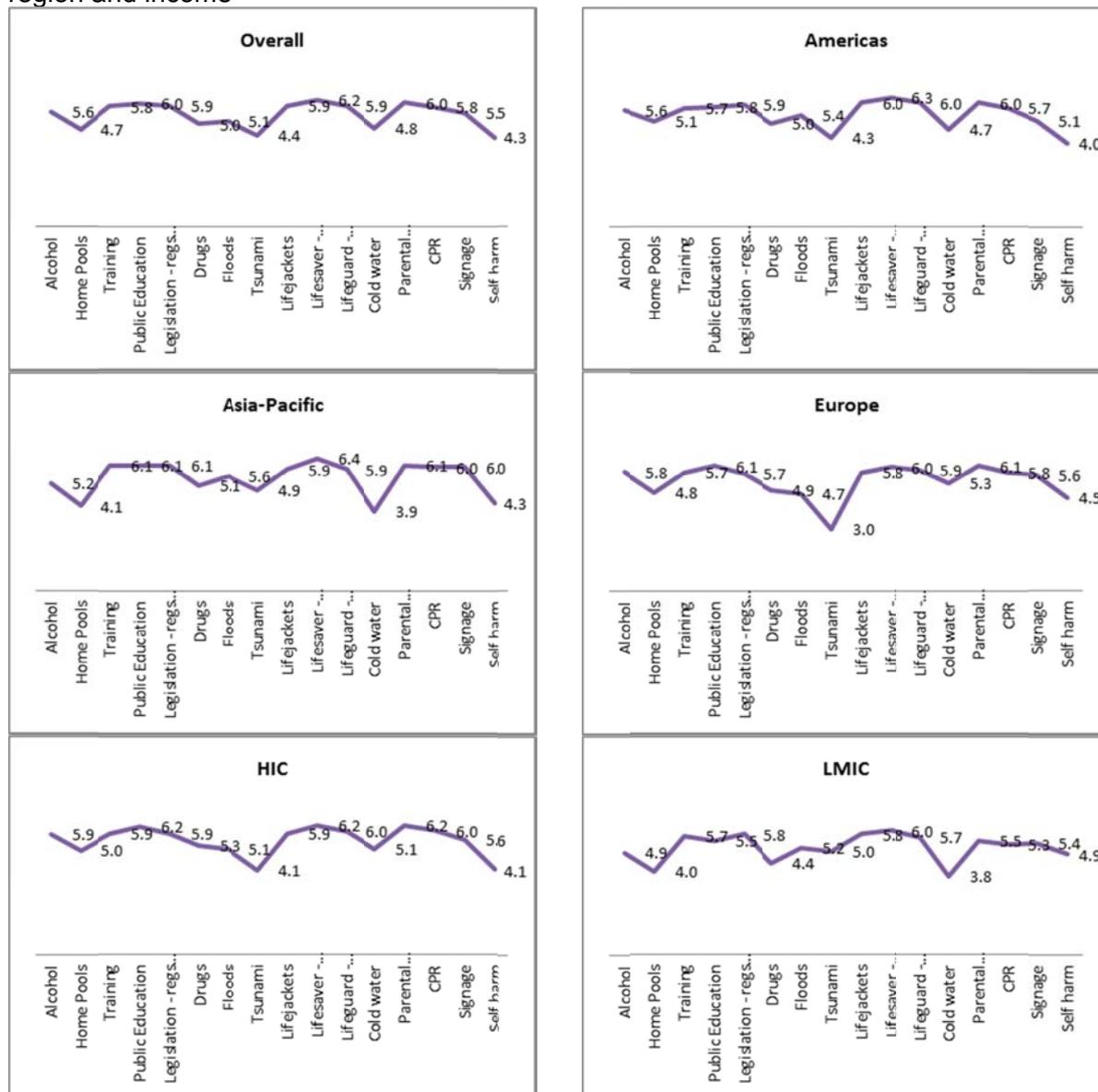


Table 4. Availability of drowning data by agency, coverage and income

	Central Government Agency		Hospital		Coroner		Medical Examiner		Mortuary		Other government agencies		Non-government agencies		University	
	HIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC	HIC	LMIC
Country-wide central registry	16	3	6	0	10	2	1	1	1	1	8	5	7	0	2	0
Province-wide registry	4	1	4	3	5	1	2	0	0	0	6	1	2	1	1	0
Individual agencies / organizations	2	0	3	1	4	1	3	2	1	2	1	0	5	1	2	0
Not Available from this entity	7	3	8	3	2	3	8	3	9	2	5	1	4	3	8	3
Unsure	0	2	5	1	6	1	11	2	12	3	7	1	7	3	11	5
Total	29	9	26	8	27	8	25	8	23	8	27	8	25	8	24	8

Table 5. Availability of resuscitation and rescue number by coverage by country income and ILS region

	HIC (n=22)	LMIC (n=13)	Total (n=35)	Africa (n=1)	Americas (n=9)	Asia-Pacific (n=7)	Europe (n=17)
Resuscitation -Whole Country	14	23	17		22	14	18
Resuscitation -Province	14	15	14	100	11		18
Resuscitation by members	18	23	20		22	43	12
Does not collect resuscitation	55	38	49		44	43	53
Rescues - Whole Country	32	31	31		22	29	41
Rescues - Province	14	23	17	100	11	14	18
Rescues - Members	14	23	20		33	29	6
Do not collect info on rescues	41	23	34		33	29	35