Conducting a Systematic Search for Multi-Country Mortality Data Sources - A Short Report

Dr. Aoife A. Kervick, Dan Ryan, and Dr. Kiran Sarma

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Table of Contents

1. Background

Low- and Middle-Income Countries (LMICs) are subject to disproportionately high rates of drowning mortality (e.g. Hyder et al., 2008; Peden & McGee, 2010). Amongst a range of key objectives recommended by the World Health Organisation (WHO) to effectively address this global health issue, is the development of National Water Safety Plans (WHO, 2014). In order to develop such a plan, accurate, timely data, detailing the true nature and extent of drowning rates and risk is necessary. Likewise, should drowning prevention policies and interventions be implemented as part of this plan, high-quality mortality data are then needed to critically evaluate their impact.

At present, the Royal National Lifeboat Institution (RNLI) are aware of four, core, multi-country datasets featuring drowning fatalities data, that provide a majority of this information, and are available for download and use. These include the World Health Organisation (WHO) Mortality Database[1], the Global Burden of Disease (GBD) study[2], INDEPTH Network[3], and the International Disaster Database (EM-DAT)[4]. The data provided by these sources are each subject to certain limitations however. In order to ensure the most accurate, reliable data are used to inform any drowning prevention measures, data from additional, complimentary sources would be beneficial.

This short report summarises the procedure adopted in order to systematically search for any additional multi-country data sources, featuring drowning data, and the findings of this process.

2. Methodological Approach

In order to identify potential data sources, a systematic search was undertaken. This approach involved three, related stages (see Figure 1. below).
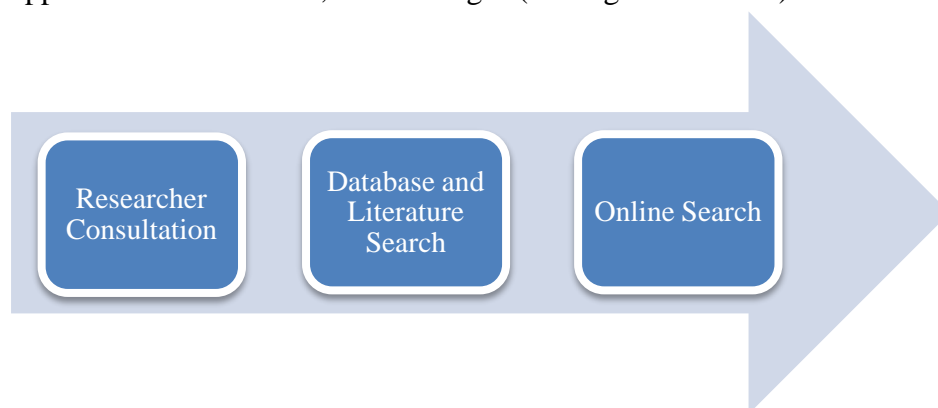
Figure 1. Stages of the systematic search process.

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[1] WHO Global Mortality Database: http://www.who.int/healthinfo/mortality_data/en/
[2] Global Burden of Disease Study: http://www.healthdata.org/gbd
[3] INDEPTH Network: http://www.indepth-network.org/about-us
[4] The International Disasters Database: http://www.emdat.be/

Stage 1: Researcher Consultation

To commence the systematic search process, recommendations were sought from the RNLI International Research Team to identify expert researchers currently working in the areas of global health and drowning prevention, who would be best positioned to suggest potential additional mortality data sources. Two such researchers were identified: Dr. Jagnoor Jagnoor from the George Institute for Global Health, and Dr. Peter Byass, from the Umeå Centre for Global Health Research, and WHO Collaborating Centre for Verbal Autopsy. They were both contacted via email, with a detailed request to ascertain if they were aware of any additional multi-country mortality data sources (featuring drowning fatality data) to the core, four sources known to the RNLI.

In addition, throughout the various stages of the systematic search process, when suitable (i.e. high-quality, and pertaining to drowning) academic papers or reports detailing studies using multi-country datasets were identified, the lead author of the study was contacted, with identical requests to the above. These requests were also sent to members of international drowning prevention organisations (e.g. the International Lifesaving Federation).

Stage 2: Database and Literature Search

A search of published research literature was then conducted, to identify any additional mortality data sources being analysed by other researchers, multi-disciplinary teams or organisations. A series of strategic keywords, and combinations of these (e.g. 'global', 'drowning', 'mortality', and 'data') were entered into the selected scientific databases (e.g. ScienceDirect, Google Scholar). These typically resulted in publications from academic journals, conferences, or technical reports, which were epidemiological in focus. Any new keywords listed in any relevant articles obtained from the search process (e.g. 'epidemiology') were adopted and then entered into the databases, to see if any new material detailing potential additional data sources could be identified.

Stage 3: Online Search

Following the 'Database and Literature Search' stage, a web-based search was conducted, in order to identify any potential additional data sources. The series of strategic keywords (and combinations of these, e.g. 'global', 'drowning', 'mortality' and 'database') were entered into selected search engines (e.g. Google, Yahoo), and the results examined. Again, the majority of results featured academic or conference papers, or technical reports. Links to book chapters (e.g. 'Data to assess the global burden of drowning' in the book 'Drowning - Prevention, Rescue, Treatment', edited

by Bierens, 2014) and to databases themselves (e.g. the European Detailed Mortality Database, 'DMDB'[5]) were also returned as results during this search stage.

3. Results Summary

During the course of the systematic search process, a number of potentially relevant data sources were identified for consideration. These are presented and discussed in relation to the stage during which they were identified, below.

Stage 1

Following consultation with both expert researchers, Dr. Jagnoor identified a potential multi-country data source, consisting of data from the 'Young Lives' cohort [6]. This is an international study of childhood poverty, which follows the lives of 12,000 children in Ethiopa, India (the states of Andhra Pradesh and Telangana), Peru and Vietnam, over 15 years. Upon further inspection however, it became apparent that although whether (or not) a child or household member has sustained a non-fatal injury due to 'drowning or near drowning' was recorded in the available datasets, drowning-related mortality data was not captured. As such, it was not deemed relevant for inclusion in the current report.

Stage 2

Once the 'Database and Literature Search' stage was complete, the majority of findings generated by this process were found to revolve around country-specific sources (e.g. 'Unintentional drowning in northern Iran - A population based study', Kiakalayeh, Mohammadi, Ekman, Chabok & Janson, 2008), rather than featuring multi-country data. In addition, those studies which did feature multi-country data were typically found to draw from the core four data sources already known to the RNLI (e.g. 'Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013', GBD 2013 Mortality and Causes of Death Collaborators, 2014). As such, no unique data sources in addition to the core four known to the RNLI were identified during this stage.

Stage 3

Following the 'Online Search' process, the results obtained from this exercise were found to, once more, relate primarily to epidemiological studies drawing from country-specific data, or the core four data sources. Novel web links to potential new data sources/databases were identified during this stage. Many of these were comprised of sub-sections of data from the core four known to the RNLI (e.g. the DMDB is comprised of WHO data for European countries) however. Alternatively, these were found to feature insufficient categorisation by cause-of-death (COD) to

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[5] http://data.euro.who.int/dmdb/
[6] http://www.younglives.org.uk/

ascertain drowning-related mortality data (e.g. the Human Mortality Database[7]). Overall, none of the data sources identified during this stage proved relevant for inclusion in the current report. A selection of those identified are described in brief below however.

Databases Drawing from the Core Four

The **European Detailed Mortality Database** (DMDB) was identified as a potential data source, containing data by cause of death (including drowning-related deaths), age and sex, as submitted to the WHO by their European Member States. As all of the data contained in this database were already incorporated in the WHO Mortality Database however, this was not deemed relevant for further consideration.

A **Relational WHO Database** was also selected for examination at this point, identified from a research paper by de Roos (2015). This multi-country database was created by the author to generate a more simple, and transparent global dataset, based on parameters including country, years, age and cause of death (including drowning incidents), for accessible data mining by researchers. This database was found to solely feature transformed data from the WHO Morality Database however, and as such, was not deemed relevant as an additional mortality data source.

The **European Past Floods**[8] database was also identified during this search stage. This dataset contains information on the impact of floods (including sustained fatalities) in countries throughout Europe (including LMICs) since 1980. Although the data incorporated in the database do feature some unique national authority data for certain countries, the vast majority of the data are sourced from the EM-DAT. As this database does not provide substantial, additional mortality data to the core four data sources already known to the RNLI however (i.e. the EM-DAT), it was not deemed a suitable, additional, mortality data source.

Last, the **Dartmouth Flood Observatory**[9] maintains a **Global Active Archive of Large Flood Events**, from 1985 to present. It reports on the number of fatalities sustained due to a flooding incident, and the characteristics (e.g. flood location, cause, start and end date, severity etc.) and other impacts of the event (e.g. how many people were displaced, cost etc.), including a narrative descriptive field to provide in-depth information about the flooding incident. The vast majority of data are sourced from media reports however, and while mortality data are documented, drowning-specific causes cannot be isolated. Overall, the EM-DAT likely represents a more accurate, reliable data source, and so this data source was not considered further. It could be interesting to compare the two data sources in future however, to see which is optimal in seeking to design disaster prevention measures.

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[7] http://www.mortality.org/
[8] http://www.eea.europa.eu/data-and-maps/data/european-past-floods
[9] http://floodobservatory.colorado.edu/Archives/index.html

Data Sources Without COD

The **Human Mortality Database**[10] (HMD) was identified during the search process as a potential data source. The HMD was created to provide mortality and population data to researchers, policy-makers, and others interested in human longevity. It provides detailed mortality data for 38 countries (including some LMICs). No COD categorisation of the data are provided in datasets however, and as such, the data are not useful in the context of understanding drowning fatalities alone (as these cannot be isolated for analysis).

The **Latin America Human Mortality Database**[11] was also selected for examination as a potential additional data source during this stage. This database documents detailed mortality data for total national territories by age, sex and cause of death, in addition to the same categories per region, within each country (Argentina, Brazil, Colombia, Mexico and Peru) from 1980 to the latest available year. Drowning deaths are captured within the code for 'External causes of morbidity and mortality' however, and cannot be isolated from other unintentional fatalities. As such, this was not deemed a suitable, additional, mortality data source.

A link to the **United Nations Inter-agency Group for Child Mortality Estimation** (UN IGME) was returned during the online search process. The UN IGME was established in 2004 to report on global child mortality estimates. They draw from all available national-level data on child mortality such as vital registration data, censuses, household surveys, and sample registration systems to provide estimates of neonatal, infant and child mortality rates from 1960 to present, for >190 countries. These data are housed in the **CME Info** database[12]. Estimates for cause-specific deaths are not provided within the database however, and as such, this was not deemed a suitable, additional, mortality data source.

Last, data from the **Demographic and Health Surveys Program** (DHS) were examined during the course of the online search. This program has provided assistance to conduct more than 300 surveys in over 90 countries (including some LMICs) since 1984, funded by the U.S. Agency for International Development (USAID). Infant and under-five child mortality rates are provided through their online tools and datasets. Specific COD data are not provided however, rendering this data source unsuitable for use in the current context. [13]

4. Conclusion

Overall, while the preliminary findings of the systematic search stages identified a number of potential additional data sources, on closer inspection, it emerged that

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[10] http://www.mortality.org/
[11] http://www.lamortalidad.org/
[12] http://www.childmortality.org
[13] http://dhsprogram.com

these data sources either did not provide suitable, or sufficient, additional data to the core four data sources already known to the RNLI, due to their various characteristics. Of note, this was not an exhaustive search (e.g. additional search engines could potentially have been used), and author response rates to requests regarding information for additional data sources were poor. Given the systematic nature of the search process however, it would now appear that WHO, GBD, INDEPTH Network and EM-DAT data do represent the most suitable data available to understand global drowning, particularly in LMICs. These data sources can now be drawn from in order to inform National Water Safety Plans, and all other related activities, provided their limitations are acknowledged. The findings from the series of Deliverables pertaining to the current project should be consulted when doing so, to identify the most suitable data source(s), based on the needs of the user.

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