Ilan Kelman's Perspectives on Researching Flood Health Issues

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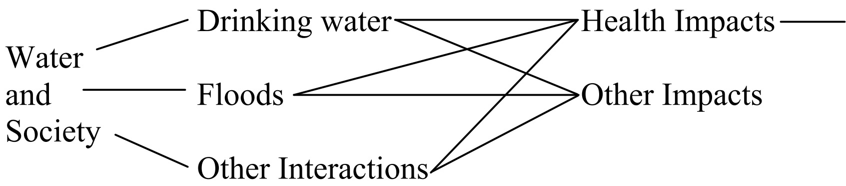
One major challenge in understanding the health effects of floods relates to the complex, interrelated processes which can cause and influence floods along with other water-related health issues. When water interacts with society, for which one possible outcome is floods, positive and negative consequences result, including environmental, social, and economic effects. One subset of social effects is health effects on human beings which can be psychological (mental) or physiological (physical) and which can result in death (lethal) or injury (non-lethal).



mental lethal	mental non-lethal
physical lethal	physical non-lethal

The categories above are not mutually exclusive. For example, mental, non-lethal impacts of a flood, such as the shock of seeing water rapidly enter your house, could slow reaction time leading to drowning which is a physical, lethal effect. Similarly, environmental impacts of a flood, such as algae growing in fields contaminated by sewage, can lead to human health effects.

These complications tend to imply that, from the four categories of health impacts, the physical, lethal effects are often the easiest numbers to determine and they are the numbers most frequently determined. Nevertheless, inherent difficulties arise with these data. At times, floods are cited as being the most lethal of all disasters involving environmental processes, yet this conclusion is disputed by other data sources and analyses. Three issues are:

- Event classification. Deaths from tsunamis, storm surges, and storms combining wind and rain are not always considered to be flood deaths. Have any jökulhlaup deaths occurred?
- A single event can skew statistics over a given timeframe. The 27 July 1976 earthquake in China killed at least 200,000 people while the 12 November 1970 storm surge in Bangladesh killed at least 300,000 people. The exact death toll used for statistics, and whether or not each event is included in a list, can impact the ranking of total deaths from different environmental processes.
- Too much emphasis is placed on water hazard "causes" of death and too little emphasis is placed on vulnerability root causes.

My primary interest and expertise is in sorting out these complexities and challenges to better understand the statistics, root causes, and full impacts of flood health effects. I try to focus on classifying and explaining flood-related deaths from the perspectives of individual and societal vulnerability. Overlaps naturally occur with studies of all drownings, all water-related deaths, water safety policies and practices, and non-lethal flood health effects.

Issues arising include:

- Many flood deaths happen in small numbers in small, highly localised events. Hence, compiling comprehensive statistics is challenging.
- Many deaths during floods occur due to poor water safety practice unrelated to increased water levels. Disputes emerge about whether or not these drownings are flood-related.
- When vehicles enter a waterway killing the occupants, the deaths are often considered to be traffic deaths rather than water-related deaths (drownings or otherwise). If the waterway which the vehicle entered was flooded or if the driver was on a normally-dry road, especially low-water crossings, should these deaths be classified as flood deaths?

- Many deaths occur due to the flood yet water is not implicated in the medical cause of death. Examples are deaths from cholera, disease due to vectors breeding in floodwater, heart attacks while pumping water, and fires from candles used due to flood-related power outages. These deaths are frequently termed "indirect" deaths. If the death would not have happened without the flood, is "indirect" an appropriate term?

Trying to answer these and other questions in order to better understand flood-related deaths, including their context within all flood-related health issues, has led to suggestions for analysing:

- The understanding of "flood" and "flood-related death". Floods include flash flooding, groundwater rise, surface water ponding, tsunami, storm surge, structural failure (e.g. dam, levee, or reservoir), rogue waves, rivers breaking banks, seiching, jökulhlaups, and—for some insurance purposes—pipes bursting, garden sprinklers being left on, or bathtubs, showers, and washing machines overflowing. Flood-related deaths include evacuation-related car crashes, stings and bites from animals affected by flooding (e.g. fire ants, snakes, crocodiles, jellyfish, and sharks), carbon monoxide poisoning from generators used during power outages, electrocutions while repairing flood-damaged power infrastructure, and suicides due to post-flood depression.
- Possible uniform classification systems for flood casualties (deaths and injuries) covering wider vulnerability data than usual categories such as age, gender, and ethnicity. In particular, individual vulnerability data should include swimming ability (often not relevant for floodwater); clothes worn; impairment from alcohol or drugs; knowledge of area; water rescue level available, needed, and attempted (e.g. lifeguard, swiftwater, high angle, ice, or confined space rescue); and medical care level available, needed, and attempted (e.g. first aid resuscitation, ALS, or quick transport to hospital). Some data overlap societal vulnerability which should also include comparisons of fatality data to the area's demographic data plus the community's flood awareness.
- Ratios of deaths-to-injuries, deaths-to-survivors, and casualties-to-non-casualties.
- Case studies of fatal flood events to identify hazard, vulnerability, and risk factors.

I wish to further explore (a) researching these topics; (b) using the results for policy development, training, operational changes, education, and awareness; and (c) understanding and overcoming the challenges and barriers of translating research into policy.

My publications directly addressing these issues are at:
http://www.ilankelman.org/publications.html#disasterdeaths
See also http://www.ilankelman.org/disasterdeaths.html