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Heatwaves, floods and natural disasters: how should we prepare?

Based on a presentation delivered at the Faculty of Public Health Conference - 7 July 2010; the kind contribution of Lucy Saunders of Islington PCT in preparing this talk is acknowledged.

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9 September 2010

This is a brief summary of lessons learned from international disaster relief interventions, for application in the context of UK disaster response.

PREPARATION OF SCENARIOS FOR PLANNING RESPONSES

The keystone of emergency planning is the development of a suite of scenarios which correspond to likely events. It is impossible to prepare for everything that might happen, so an initial assessment what kind of disasters could occur is needed. The goal is to develop detailed plans of how events could be managed to

- prevent loss of life,
- minimise the spread of disease, and
- avoid hardship and suffering.

This is best done in an iterative consultation process, by considering the most obvious effects of each type of disaster, then talking to people with expertise in that area to add detail to the scenario. Other implications of the situation will emerge; repeating the process will deliver two products:

- The first is a detailed and plausible scenario with likely outcomes. Continuous reality checks should be made as each piece of data is built into the scenario: Is the chain of inference sound? What other outcomes could result instead? What could prevent things going this way? Once some clarity and consensus has emerged from all of the "What ifs", then further expert informants can be found to assist in testing whether the scenarios developed cover all likely outcomes. Members of the general public who are likely to be affected should be consulted as well as "experts": people with different perspectives may identify issues overlooked by the professionals. Scenarios must seem feasible to all informed advisors, with any identified objections addressed. Triangulate information to ensure completeness.
- The second is that during the consultation links will have been made with various experts who can be convened to form an advisory group of relevant experts for ongoing involvement. Stakeholder analysis should be performed to ensure that all key groups have been consulted.

There are UK professional specialists in disaster relief. The British Red Cross Society and St John Ambulance have nationwide teams of trained and organised volunteers; such pre-existing command structures are invaluable in a crisis as they facilitate teamwork and coordinated action. The emergency services and hospital Accident and Emergency teams are a tremendous resource for planning and response. The UK Armed Forces

have logistics skills, equipment and large-scale coordination of manpower that are invaluable in the event of a large-scale problem because of their unitary command and control structure and their world-renowned training. In disasters in China (earthquake 2008) and Bangladesh (atypical floods, 2001), army medical teams were quick off the mark and superbly organised.



Chinese military hospital surgery unit set up in the car park of a city hospital a few hours after aftershocks rendered the 12th floor hospital operating suite unsafe, Mianyang City, Sichuan, China 2008

Photo L Reynolds

There are also UK-based experts whose usual remit is abroad but who could assist in a disaster here. RedR (Registered Engineers for Disaster Relief) maintains a register of emergency engineers, water and sanitation experts and emergency medical staff, all pre-trained in disaster relief and deployable on a few hours or days' notice.

Funds must be identified in advance, with swift draw-down facilities to provide adequate cash and swift transfers. Logistics must be thought through, step by step, and the provenance of equipment and staff arranged.

DEVELOPING A FLEXIBLE RESPONSE CAPACITY

Nevertheless, no matter how well-informed and thorough the process, when the disaster hits, it may take a different turn from that envisaged in planning, so maximising flexibility of plans and resources is essential.

Thus stockpiling of goods and equipment is best minimised: when disaster strikes things will rarely be in the right places and transport may be difficult. Stockpiles require protection from theft and damage; for pharmaceuticals and other medical consumables, there is the added difficulty of limited shelf-life.

The way to ensure availability of both staff and supplies as and where needed is to identify who routinely uses the goods and personnel that will be needed, and to make arrangements with them to deploy in the event of need. Formal Memoranda of Understanding would probably help, but in addition to these high-level agreements, regular contacts with decision makers and field teams should also be maintained to ensure that promises will be kept when it is critical.

Consider command and control structures and specific training. Standby teams may be brought together for planning exercises to ensure that deployment will be as smooth as possible when it happens. Thorough, detailed, planning, and management of expectations are the key.

WHEN DISASTER STRIKES

After the 7/7 attack, mobile phone networks shut down for some hours due to system overload; the same happened in Haiti after this year's earthquake. In a major disaster, it is unwise to rely on any telephone systems for communication. In addition to overload, they have two other vulnerabilities: they require staff to run the system, and they need electricity. The best means of emergency communication is radio: it needs only the power needed to run sending and receiving stations, usually achievable with batteries or small generators and transportable antennae. An emergency network needs to be arranged in advance, for internal communication in the event of crisis. Countrywide police networks may be suitable.

A consequence disasters involving flooding is that normal transport fails. Motor vehicles cannot run once water enters their exhaust pipes. Rail transport with the electrified line submerged cannot operate. The ash cloud showed us how, in this globalised world, we depend for necessities on remote people and organisations, and thus on reliable and swift transport. Our interdependence is intercontinental: Kenyan flower farmers suffered hardship because their flower crops could not be flown to their European market because of the Icelandic ash cloud. Emergency planning should consider how transport for food and other essential supplies could be affected, with airlift feasibility researched for extreme situations.

For medical facilities, refrigeration of vaccines and other perishables must be maintained, with cold-chain management ensured and alternative options for fuel-hungry facilities explored. This emergency cold chain must be independent of mains electricity; it should include safeguards to show if maximum temperature has been exceeded.

Appropriate use of mass media can reassure people and ensure they are informed of essential information and arrangements: Sichuan had a round-the-clock earthquake-TV station which played a key role in coordination of management and evacuation of affected populations. Effective disaster management involves ongoing briefings to journalists, and press releases to calm and direct the public.

Other key supplies in event of major emergency, as standard in international relief agencies:

- Plastic sheeting
- Soap
- Tapstands and piping

- Blankets
- Tents
- Disinfection facilities (bleach, medical disinfectants, pressure-cooker type autoclaves, fuel to heat them)
- Chlorine bleaching powder; this needs careful management, as it can explode if left in sunlight or shaken about.



People sleeping in the streets outside their homes after the Sichuan earthquake, from fear of further quakes, Mianyang City, Sichuan, China 2008

Photo L Reynolds

PROBLEMS ARISING FROM FLOODING

In areas most likely to flood, options for transport by water should be reviewed. Boats should be located and reserved ahead of time, ideally under contract; otherwise market forces will result in all available boats being already sold or leased, or if not, prices to rent or buy them will be exorbitant. It may be useful to hold some easily-transportable inflatable boats, for example Zodiacs. If this is done, care must be taken to ensure that operators are appropriately trained, in order to avoid accidents in their handling. If the forces have adequate capacity, arrangements with them for its deployment in the event of disaster are probably best.

The main health threats which may result from flooding are:

- Diarrhoeal disease due to lack of facilities for sanitation and hand-washing, and from contamination of water supplies;

- Stranding of elderly, infirm and disabled: liaise in advance with community matron services & social services to identify immobile people and those who rely on dialysis, meals on wheels, life-sustaining medications, etc.;
- If water levels rise high, industrial and household chemicals may contaminate the water, creating an unpredictable and noxious mix which will cause skin problems and possibly poisoning in household and wild animals;
- Urinary and reproductive tract infections from living in wet clothes;
- Respiratory problems from mould spores;
- When floods recede, carbon monoxide poisoning can occur from outdoor heaters and generators used to dry homes, because they are not designed for use in confined spaces.

PROBLEMS ARISING FROM MAJOR POPULATION DISPLACEMENT

Dehydration is the first health issue to arise when people are displaced away from their homes and other facilities. Mass water treatment for drinking water may quickly be essential, and the international SPHERE guidelines lay down a minimum acceptable provision of 5 litres/day/person initially. OXFAM has particular expertise and equipment for emergency response in this area.

This allowance should rise to 20 litres/day/person as soon as that becomes possible, to avoid water-scarce disease from lack of water for washing and sanitation.

Uncollected rubbish may attract flies, rats and fungus growth and cause disease, especially in the summer. Conversely, in the winter, hypothermia is a serious threat in the UK: waterproof shelter, dry clothes, towels, and blankets can be life-preserving.

The need for other medical services does not cease because there has been a disaster. Ongoing treatment for serious chronic disease may be inaccessible, and mental health problems not only continue but can be created or exacerbated by disasters.

In any disaster involving displacement of population, some children will become separated from their families. Save the Children and the Red Cross have specialists for tracing families and reuniting them with displaced children. In the immediate aftermath of the Aceh tsunami many teenage girls apparently disappeared, probably taken to staff brothels elsewhere in Indonesia. No-one knows how many girls were taken because the traffickers got on to the site before aid workers could organise registration of the displaced. While heroism and solidarity is brought out by disaster, some people will use the opportunity to exploit others.

Sexual assault may be an issue whenever displaced populations are sheltered with strangers in unfamiliar settings, and consideration of the particular vulnerabilities of children and young women should be included in planning and ongoing decision-making. Facilities for counselling and legal advice for sexual assault plus post-exposure prophylaxis for HIV, HBV, and STIs should be arranged when the immediate emergency actions have been taken.

A peak in STIs is to be expected after an emergency. Spouses are separated, sometimes permanently, teenagers may be displaced from their families, people are knocked off balance mentally by the catastrophe, and many new sexual partnerships form as people seek comfort. It is therefore wise to provide condoms and contraception.

SUMMARY OF KEY POINTS

The approach to planning effective disaster relief should involve:

- Developing planning around likely scenarios;
- Setting up linkages between key teams with pre-agreed areas of responsibility;
- Prearranging coordination and access to essential supplies;
- Maintaining flexibility;
- Include low-tech independent means of communication and transport capacity;
- And expect the unexpected!



Power barge washed 5km inland into an Aceh village, 2004
Photo L Reynolds

Dr Lucy Reynolds has worked in the following emergency relief contexts:

- Reorganised natural disaster preparedness facility, Bangladesh, 2000-2001
- Managed medical intervention for atypical flood, West Bangladesh, 2000
- UK trauma surgery team facilitator, 2008 Sichuan earthquake
- HIV control after the 2004 tsunami and the 2005 earthquake in Indonesia
- Worked with displaced people in Africa, Asia and Balkans 1996-2008