TACTIC

TOOLS, METHODS AND TRAINING FOR COMMUNITIES AND SOCIETY TO BETTER PREPARE FOR A CRISIS

Short Report: TACTIC's first workshop on preparedness for epidemics in the UK

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Preamble

TACTIC (Tools, methods And training for CommuniTIes and society to better prepare for a Crisis) aims to increase preparedness to large-scale and cross-border disasters amongst communities and societies in Europe. Throughout its two-year duration (May 2014 – April 2016), TACTIC will analyse risk perceptions and behaviour to identify pathways from risk perception to preparedness, and will develop a preparedness audit that communities can use to assess how prepared they are for different types of crises. Additionally, TACTIC will focus on identifying and categorising good practices of communication and education practices for preparedness. The audit, communication and education practices will be discussed and analysed with stakeholders in a series of workshops as part of TACTIC's case studies on four types of crises: terrorism, floods, epidemics, and earthquakes. Subsequently, a long-term learning framework for improving community preparedness to a range of crisis situations will be developed. All of TACTIC's outputs will be presented in a web-based platform.

This document outlines the aims and preliminary findings from TACTIC's first workshop on epidemics in the UK. The workshop was held in Penrith, Cumbria on 31st March 2015. Northumbria University acknowledges and appreciates the significant contributions made by workshop participants to the content and conceptualisation of this report.

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1 Introduction

One of TACTIC's overarching aims is to understand preparedness from a cross-boundary, 'multi-hazard' perspective. As a part of this effort, TACTIC partners are investigating floods, earthquakes, epidemics and terrorism through a series of case studies. Northumbria University is conducting a case study on epidemics in the United Kingdom (UK) focused on the 2001 Foot-and-Mouth Disease (FMD) event. While FMD is not uncommon in the UK, as between the years of 1918 and 1967 the UK was free from outbreaks of FMD for only 2 years (Scudamore and Harris, 2002), the 2001 event was unprecedented; the last major outbreak in 1967-68 FMD resulted in the slaughter of over 400,000 animals. The 2001 FMD event resulted in the slaughter of 4 million animals for disease control purposes and an additional 2.5 million killed that on welfare grounds (ibid). Additionally, significant damages were incurred to the tourism industry.

Within a month of the 2001 UK outbreak, FMD spread to France, Ireland, and the Netherlands. FMD was initially framed in the UK primarily as an agricultural and animal health hazard, and yet what unfolded was a complex scenario, comprising cascading human, social, organisational, political, economic and environmental effects. One of the tasks identified for this case study is to explore the extent to which preparedness lessons were learnt at all scales: from the global to the local.

1.1 Case study description

Cumbria, the location of the case study site in the North West of England, was the epicentre of the 2001 FMD outbreak. More than 44% of Cumbrian farms were infected with FMD (Cumbria Foot and Mouth Disease Inquiry Report, 2002). The 2001 epidemic in Cumbria is unique because it is the only FMD epidemic in living memory that occurred in a highly diversified rural area, where tourism and agriculture are major components of the economy (ibid). Economic impacts were significant: FMD reduced the economy of Cumbria by an estimated £266m, or 4% of the GDP of the county. Income loss to agriculture was approximately £130m or 41% of the normal total livestock output for the county. Indirect effects on agriculture were estimated at £30m, two-thirds of which were related to the animal feed industry. Compensatory payments to farmers by the government of approximately £90m offset some of the economic loss to farmers. However, compensation for indirect effects, such as loss of business due to movement bans was not provided. Total revenue to tourism was reduced by £200m with an additional £60m estimated in indirect effects (ibid).

Whilst these general estimates are useful in understanding the gross impacts on the Cumbrian economy, other analyses recommend differential impacts occurred. Disease control strategies such as movement bans, footpath closures and livestock restocking restrictions which restricted or prohibited access to farms and businesses within these areas were more severe in some parts of Cumbria compared to others due to the geographic spread of the disease. Businesses that were on the periphery of the honey-pot region of the lakes, one of the most popular tourist attractions, suffered greater economic losses due to disease control measures than areas where disease control measures were less severe such as the National Park where there were limited disease control measures taken in small defined areas (Convery, Mort, Baxter and Bailey, 2008). Conversely, some local hotels and

guesthouses were able to continue to trade profitably as a result of the influx of frontline workers brought in to assist with disease control, for example, vets and slaughter teams, as who were working away from home (ibid). Therefore, valuable lessons learnt are that i) thought should be given in disaster plans as to ways in which the influx of workers can benefit a community or at least partially balance loss of trade, ii) understanding differential impacts within affected areas is important for informing future disaster plans and rebuilding to prepare for other potential hazards (ibid).

Disasters are commonly reported in terms of economic impacts while social consequences, which may be of equal or greater import, are frequently underreported or less acknowledged. Failure to acknowledge the social impacts of disasters can limit future preparedness and recovery planning; a point that may be especially important for epidemic or pandemic hazards, which can last for months to years and result in significant trauma: physical, psychological, economic, social and environmental. The majority of the lessons learnt literature on the 2001 FMD event, as well as the preparedness literature more generally, does not typically examine social consequences of hazards. Hazard preparedness literature for epidemics and pandemics tends to focus on shorter-term individual behaviours during an epidemic, or during the threat of an epidemic, such as hand washing, wearing a mask or respirator, avoiding crowds, or taking vaccines (Shreve et al., 2014). Studies focusing on preparedness behaviours of 'communities' or groups of people, especially those spanning longer durations during an outbreak, are less prevalent in the preparedness literature with some exceptions. The book 'Animal Disease and Human Trauma' (Convery, Mort, Baxter and Bailey, 2008) is one such exception, as it documents the social and mental health consequences of the 2001 FMD event throughout all stages of the crisis. Drawing out lessons learnt from these studies can better inform preparedness and recovery for epidemics. Clarifying the social consequences of disease control strategies such as movement bans, quarantines, or animal culls, can better enable decision-makers to make balanced and ethical decisions.

The 2001 FMD event in Cumbria also offers an opportunity to further identify lessons learnt regarding cascading or knock-on effects of disasters. Cascading effects can be difficult to discern without comprehensive, longer-term studies spanning different sectors. The literature base for the 2001 event in Cumbria, whilst largely focused on government handling of the event and impacts to the farming and agriculture sectors, also includes studies on impacts to tourism (see for example Ritchie et al. 2004), utilisation of vaccines and scientific progress (see for example Paton, Sumption, and Charleston, 2009), engaging citizens' voices into public health decisions (see for example Convery, Bailey, Mort and Baxter, 2005), international considerations for eradication of the disease (see for example Rweyemamu et al., 2007), and lessons learnt for rural policy (see for example Donaldson et al., 2005). Thus, one element of this case study will be looking at lessons learnt for FMD across different sectors and scales to draw together more holistic lessons learnt for epidemics and pandemic preparedness, for instance, considering cascading or knock-on effects. Box 1 (below) provides a general overview of lessons learnt from the 2001 FMD event from government and public inquires.

Box 1: Key messages from inquires on 2001 FMD event in Great Britain.

Government inquires and related publications

- Scudamore and Harris (2002): observations of lessons learnt from the perspective of DEFRA and the State Veterinary Office. This analysis served as the basis for the three government inquiries (e.g. Anderson 2002; Follet, 2002; Curry, 2002).
- Anderson (2002, 2008): makes recommendations for government handling of future animal disease outbreaks.
- Follet (2002): reviews scientific questions pertaining to the transmission, prevention and control of epidemic outbreaks in Great Britain
- Curry (2002): does not explicitly examine FMD, but makes recommendations regarding the future of food and agriculture in Great Britain

Key lessons learnt from the government inquiries pertain to the need to improve disease surveillance and initial response time, revising contingency plans to deal with larger epidemics that require greater resource demands, improving communication methods and IT, and recognising and planning for the economic impacts of animal disease on Great Britain's economy.

Public inquires

- Local inquires were made by County Councils of Devon, Northumberland, Gloucestershire, Shropshire and Cumbria in 2002.

Key lessons learnt from public inquiries pertain to specific communication challenges and repercussions, environmental and social impacts, economic impacts by sector, and access to decision-makers.

The unprecedented scale of the 2001 FMD epidemic and the extensive economic, social, and environmental costs prompted major changes in the governance of animal diseases in the UK. During the 2001 FMD outbreak, disease control was coordinated through the Departmental Emergency Control Centre (DECC) located in the headquarters of the State Veterinary Office (SVS) in London (Scudamore and Harris, 2002). Local Disease Control Centres (LDCCs) were established in areas of the country where outbreaks of FMD occurred, frequently where Animal Health Divisional Offices (ADHOs) were located (ibid).

The most notable change in governance structure of FMD and other exotic animal diseases was the dismantling of the Ministry for Agriculture Food and Fisheries (MAFF) and its replacement with the Department of Environment Food and Rural Affairs (DEFRA). Recognising that existing contingency plans, whilst they met with EU standards at the time, were rapidly overwhelmed during the 2001 FMD event (Scudamore and Harris, 2002), DEFRA has revised the local and national contingency plans for FMD and other exotic diseases. Additionally, significant legislative changes have been made, e.g. the Animal Health Act of 2002 and the Civil Contingencies Act of 2004. The Animal Health Act provided a legal basis for a number of disease control measures, including animal culling which was very controversial in 2001. The Civil Contingencies Act provides the legal powers for the wider framework for government management of emergencies and placed responsibilities on certain bodies such as emergencies services to plan for, and respond to, civil emergencies (Anderson, 2008). Essentially, the central government still maintains decision-making powers, but greater responsibilities for hazard risk reduction, for a greater scope of hazards, and execution of disease control measures during an outbreak have been shifted to the local and regional levels.

Identifying and understanding lessons learnt or still to be learnt is best informed through a participatory process engaging people from a diverse sampling of the community with knowledge and first hand experience of the hazard event. A key aim of TACTIC's first workshop on epidemics in the UK was to engage with individuals and practitioners in the Cumbria community to begin a dialogue on epidemic preparedness and the transfer of lessons learnt from the 2001 FMD event to other hazard types. More specific details regarding the aims, objectives and structure of the workshop are provided in the following section.

1.2 TACTIC's First Workshop on Epidemics in the UK

1.2.1 Workshop aims and objectives

The overall aim of the workshop was to better understand, with the benefit of hindsight, the complexity of the 2001 foot-and-mouth (FMD) event and its similarity to other hazard scenarios. In preparation for the workshop a database was compiled of lessons learnt on FMD in the UK from peer-reviewed and grey literature to inform the general context of the 2001 FMD event in England. A series of informal interviews was conducted with local researchers from Lancaster and Cumbria Universities and via telephone and email discussions with local organisations engaged in farming and agriculture.

Specific objectives of the first workshop included: mapping the networks (e.g. actors and relationships) that existed within and outside of the community at the time of the 2001 FMD event; better understanding learning and communication needs of various actors; and receiving feedback on the first draft of TACTIC's preparedness audit for epidemics.

1.2.2 Workshop participants

Workshop participants represented a diverse professional background including farming, academic research, public health, community service organizations, and journalism. Participants were engaged with a range of organizations from Lancaster University, Public Health England, Cumbria Voluntary Service, and the Farming Community Network. Participants are residents of Cumbria with firsthand experience of the 2001 FMD event, and all are actively engaged in different facets of community-level hazard preparedness. Two participants were farmers; one who had conducted extensive research and published on the public health impacts of the 2001 FMD event, and another who helped to establish a charitable organisation to support farmers through difficult times, and who is also an active journalist publishing on farming and agriculture topics. Two participants are actively engaged in hazard preparedness and resilience professionally; one who works in emergency preparedness and resilience in the public health field, and another who works with community stakeholders to build hazard resilience.

Regrets were sent from Cumbria City Council, Cumbria Fells and Dales, The Women's Food and Farming Union, and the National Farmer's Union. Individuals from each of these organisations were supportive through email exchange and informal telephone interviews prior to the workshop.

Guest speakers included Hugh Deeming and Belinda Davis from the emBRACE project, which focuses on building disaster resilience amongst communities in Europe (http://www.embrace-eu.org/). Hugh and Belinda have conducted extensive fieldwork and research in the Cumbria region pertaining to flood resilience.

TACTIC partners Susan Anson from Trilateral Research & Consulting LLP, Annemarie Müller from the Helmholtz Centre for Environmental Research (UFZ), and Alkiviadis Giannakoulias and Ioannis Kotsiopoulos from European Dynamics SA attended and provided support during the workshop. TACTIC partners Cheney Shreve and Maureen Fordham from Northumbria University organized the workshop.

1.2.3 Workshop Structure

Three participatory activities were designed to facilitate discussion of workshop objectives. A brief description of these activities and outputs are described below.

1.2.4 Mapping networks and learning needs

The first participatory exercise investigated mapping networks and learning needs. A mock-up of the initial network (Figure 1), as informed from the literature on lessons learnt, was presented to start off discussion. A bare timeline was presented with the goal of identifying gaps and filling in lessons that were learnt and lessons still to be learnt (Figure 2).

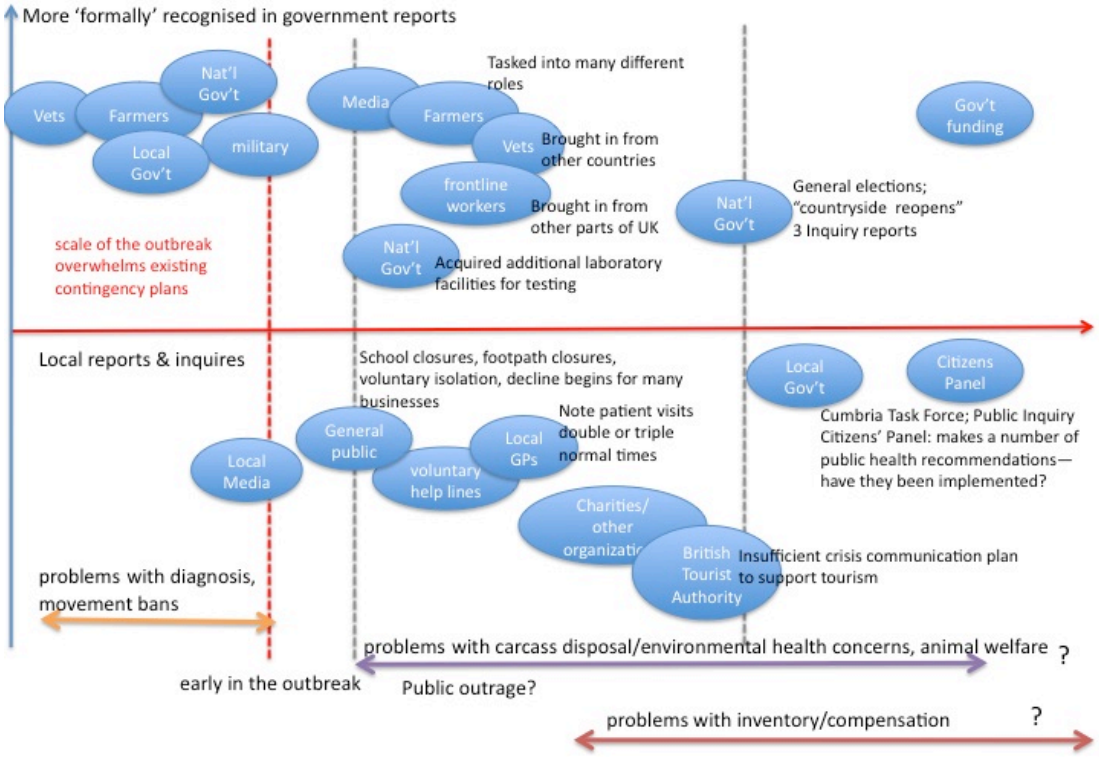

Figure 1: initial mock-up of key stakeholders or actors and tasks or problems experienced between various networks during the 2001 FMD event as identified from the lessons learnt literature. Time is on the x-axis and increasing stakeholder involvement on the y-axis. More 'formal' actors that are emphasized in the government inquiries are highlighted on the top. Less recognised or 'informal' actors highlighted in other lessons learnt reviews or local studies are highlighted on the bottom tier.

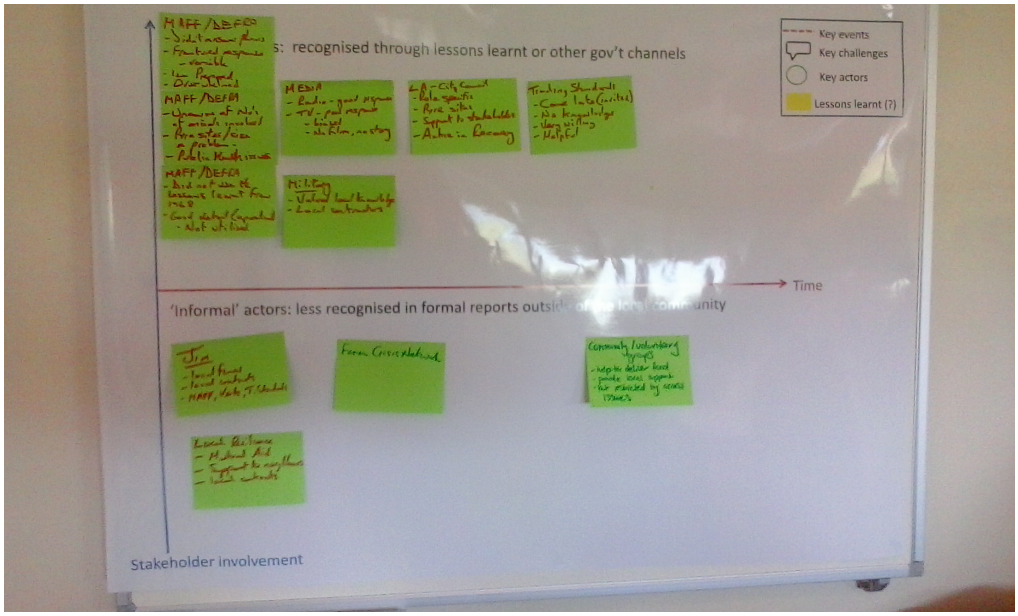

Figure 2: Identifying gaps in the literature and informing on lessons learnt and to be learnt from the 2001 FMD event from the local perspective.

From conversations regarding the initial mock-up, the following observations and needs were identified during the first group activity (Figure 2).

While government inquiries and related reports on the 2001 FMD event do emphasize communications as a major challenge to effective response, workshop discussions provided much more detailed insight into the timing and nature of communication challenges throughout the event. The summaries below address the primary areas requiring additional attention to inform epidemic preparedness.

Communication

- ***Disease control***: initial response by the national government was delayed due to challenges diagnosing and reporting the disease, e.g. transfer of information from local to national actors.

- ***Disease monitoring and reporting***: farmers, veterinarians and other actors where frequently faced with significant time delays regarding disease diagnosis on the farm, spread of disease between farms, timely information on cull activities, carcass disposal, and regarding inventories and compensation activities for animal slaughter, e.g. transfer of information from decision makers at the national level to the local level and between actors at the local level was experienced at all stages of the disaster.

- ***Consistency of messaging and challenges with misinformation***: messaging about the current status of the epidemic (e.g. movement bans, infected and suspected farms) was inconsistent among different agencies and organisations, and geographically which had the effect of slowing down response time and adding to feelings of frustration. Sensationalism of the event on television and online, where graphic pictures of the animal slaughter were routinely posted, generated further feelings of violation of privacy of local residents to the extent that some no longer watched television news broadcasts. It was noted that this disaster sensationalism and the associated impacts also commonly occurs during flood events in the region.

- ***Radio played a critical and positive role in communications:*** local residents came to rely on radio, especially BBC Cumbria, to provide timely information on the hazard. It also offered respite from the disturbing images broadcast on TV and Internet.

- ***Community messaging sources*** have more recently been utilized for flood response with positive feedback. Whilst community messaging was utilized during the 2001 FMD crisis, for instance, the National Farmers' Union (NFU) provided updates one or several times a day.

- ***Internet sources***: The use of personal computers for Internet was less prevalent prior to the 2001 FMD crisis. The FMD event did much to spurn the use of Internet and mobile phones in rural areas. The Pentalk Network was originally set up in March 2001 in the Penrith area of Cumbria to provide free computers and IT training for farmers at the height of the FMD crisis. It rapidly spread to the whole of the County and gained over 2400 Cumbrian farmers in its membership. The scheme was run by a voluntary charitable company, which drew its financial support from local, and national government, and from educational, business and charitable sources. Pentalk aimed to continue to help farmers to communicate more effectively online and develop their IT skills to improve their farm businesses. Whilst Pentalk has ended, it can be utilized as a case study for lessons learnt regarding good practice for identifying and addressing communication needs during an epidemic.

- ***Mobile phones***: Mobile phone usage was less popular prior to the 2001 FMD crisis, however the widespread usage today presents an opportunity to further enable SMS and access to other Internet and community messaging sources during a disaster when cell tower and/or Internet resources are available.

- ***Media played an important role as a resource for communicating residents' concerns to the general public***: while there were examples where media intrusion was a problem, there were also benefits of media involvement for local residents. For instance, the media worked with residents near the pyre sites, animal rights organisations that wanted to campaign against animal slaughter, and communicating these different views to the general public. Another, less frequent consideration for all disaster events, is the hurt felt when the national media moves on from an event, however, this is an opportunity where local press coverage becomes even more important as a sounding board for grievances and epidemic related news (Convery, Mort, Baxter and Bailey, 2008). Fear of spreading the disease kept many people from engaging in public activities that they normally would have, making virtual options represented by radio and Internet even more important for communicating concerns and needs.

- ***Compensation and recovery:*** are not well emphasized in the formal literature regarding efficiency and communication and require further investigation. Workshop discussions highlighted compensation as an area of contention. Where some farmers' may have profited economically, as compensation payments exceeded the livestock market value, others received less compensation than it would cost them to re-stock. Compensation values do not reflect other significant costs during the 2001 FMD crisis including infrastructure, human resources (vets, slaughter teams, disposal teams), other materials (e.g. pyre materials, etc.) and anecdotal evidence recommends there was much wastage (Convery, Mort, Baxter and Bailey, 2008). Compensation for services rendered during the disaster was also unequal; some slaughtermen reported earning £13.50 an hour, money they could not hope to match in normal working circumstances, while an apprentice farrier whose employer had little work because of restrictions earned £5 an hour for very unpleasant disposal work dragging out carcasses. Therefore, an important

lesson to learn from the 2001 FMD compensation example is that recovery allocations and costs should be more thoroughly examined to ensure fairness and avoid wastage.

Military engagement

- The military were praised for their utilization of local knowledge and establishing a 'battle rhythm' during the crisis. Whilst several formal reports note the engagement of the military as a positive turning point during the event, little to no attention is given as to *why* this engagement was successful. It was noted that a potential lesson to be learnt from this would be to engage disaster practitioners and interested community members more with the military to understand military tactics for utilizing local knowledge and taking control of a chaotic situation to improve epidemic preparedness planning. However, it must also be recognised that the disaster literature has provided a significant critique over many decades of militaristic approaches to civil emergencies (see for example Dynes, 1994). A more specific analysis is needed of what works and what does not in the context of civil-military engagement in epidemics/pandemics.

Public health

Public health: Public Health England (PHE) is very proactive with regard to 'human' diseases. The Ebola outbreak in West Africa, for instance, evidences this well, as PHE was engaged and the disease wasn't even based in the UK. The pandemic flu outbreak of 2009 provides another illustration where public health was brought to the fore. There seems to be a disconnect however in the area of engaging public health expertise to address potential public health impacts of 'animal' diseases, which is an important lesson to be learned from the 2001 FMD crisis. Regarding government reports on the handling of the crisis, many largely overlooked the public health impacts of FMD, in part because aspects such as mental health and well-being are more difficult to quantify. The Cumbria public inquiry report as well as the results of a study on public health impacts (e.g. Mort, Convery, Bailey and Baxter, 2004), however, revealed the significant negative impacts on health and wellbeing of the 2001 FMD event. Informal sources such as voluntary helplines, many of which sprang up during the crisis to support community needs, saw a marked increase in the demand for health and wellbeing support services. Thus, an important lesson to be learned from the 2001 FMD crisis is that there is a need to consult informal, as well as formal, resources to understand disaster impacts. Another important consideration is that, whilst integrating informal and formal records of health service needs during a disaster can enable better understanding of the health impacts, some health impacts may still be masked; often times the negative health consequences of a disaster may be more subtle, resulting from the distortion or disruption of people's lives during the crisis (ibid). Methods such as 'lifescapes' (i.e. the complex pattern of work/home/family/social life/general health that gives a person their sense of identity) that were developed from public health research results during the 2001 FMD event help to explain these subtitles and can be used to better inform disaster planning (ibid).

Networks

Network fragmentation: network fragmentation occurred as a result of movement bans and associated restrictions on business and community life. The wide geographic spread of the disease may also have caused strain or internal fragmentation within different agencies responding to the crisis. Residents were at times isolated from their farms, their homes, their schools, from community gatherings and from activities such as hiking in

the region. Non-residents experienced restricted travel to Cumbria, which had serious knock-on effects for tourism. [1]Additionally, tensions were created within the community between those who were directly affected (e.g. 'insiders') such as farmers and those who were indirectly affected (e.g. 'outsiders') such as hikers who were unable to access hiking areas due to footpath closures. These tensions sometimes manifested as blame toward farmers and demands that 'normal service' (e.g. pre-disaster conditions) be returned. The fragmented response of different agencies was identified as a major problem, which was compounded by resource scarcity and further contributed to communication problems, i.e. many organisations had such a high turnover during the crisis (and subsequently through austerity measures) that the institutional memory was essentially non-existent. Institutional memory would likely be more of a problem today, as austerity measures have manifested as a reduction in government staff 'on the ground'.
To our knowledge, training materials to bring new or temporary workers up to speed were not prevalent in 2001 and establishing these educational materials could further inform preparedness planning.

Network growth: new growth also emerged during the event, for instance, the establishment of voluntary helplines. The vital importance of informal networks such as voluntary helplines or community members and neighbours stepping in to help deliver food or provide other support is largely absent from the preparedness literature and from lessons learnt reports and inquires. While these networks may be temporary, they can still have a lasting effect on the community. A lesson to be learnt here is to focus on the growth opportunities and leadership that emerged during the hazard event to understand how this may be used to inform preparedness for other hazard events. The importance of hosting social events in affected areas after the crisis was highlighted, as well as the acknowledgement that people may prefer not to be reminded of a crisis after recovery and preparedness efforts should be respectful of this, focusing on the future and mindfully incorporating lessons learnt.

<u>Cascading effects</u>

- ***Cascading effects***: are not well evidenced in the formal lessons learnt literature on the 2001 FMD event or in the preparedness literature more generally. Several examples were posed from the 2001 FMD event, to be followed up with further research and discussion, e.g. vaccination poses potential knock-on effects for the dairy industry because milk from vaccinated animals requires double pasteurization and has a more restricted market, thus knock-on effects of various intervention strategies for the agricultural market and or food chain should be better considered; the potential for politicization of disease control measures needs to be further explored, i.e. badger culling to prevent the spread of tuberculosis has become a very politicized issue. Similarly, the announcement by the government that FMD ended just prior to the general election was seen as a political move by many parties, thus, there is a need to more heavily consider how the potential for politicization may impact disease response. Another potential area of concern for cascading effects pertains to the transboundary nature of epidemics/pandemics and thus, decision-making. Two-way communication

[1] Kai Erickson refers to disaster 'insiders' and 'outsiders' in the preface to the book 'Animal disease and human trauma' to describe the tensions that can arise between different individuals/groups who perceive and experience the disaster in different ways. Erikson writes eloquently about being an 'insider' or an 'outsider' when disaster strikes and it is sometimes comforting for those 'outside' to reinforce that boundary and detach themselves from the crisis, demanding the resumption of 'normal service'.

needs to exist between local, national and international parties to understand impacts and needs. There are many challenges that can arise locally, for example, the initial delays in government response related to inadequate knowledge/information on the natural practice of farming in Cumbria (Rossides, 2002) and internationally, as not all parties affected may not agree on appropriate response, e.g. differing opinions on vaccination policy held between different actors.

1.2.5 Summary: Mapping networks and learning needs

In summary, it was apparent from workshop activities and discussion that the complexity of the 2001 FMD event was only partially captured in the formal literature and inquiries on lessons learnt. Where the role of formal government actors or agencies was more clearly delineated in the literature, the role of informal actors, which was vital to community preparedness, response and recovery, has not been adequately portrayed. Fragmentation was identified as a challenge to epidemic response cross-cutting the areas of communication and public health. Inconsistent messages and misinformation by various agencies and actors resulted in delayed response times. Sensationalism of the disaster event in the media further contributed to negative health impacts. Fragmented networks and poor communication across these networks also worsened efficiency of resource allocation throughout the crisis; from delays in disease diagnosis limiting response time, lack of timely information on the spread of the disease further restricting actors movements and generating stress, lack of clearly established forums for citizens' to voice concern, and consideration that attendance of these forums (e.g. public meetings) can further impact the spread of the disease, limiting people's access to decision-makers, and uncertainty regarding inventory and compensation planning and implementation for animal slaughter, which could delay recovery. These are all serious challenges, some of which have foreseeable solutions and others, less so. The second activity and group discussion focused on the draft of TACTIC's epidemics preparedness audit, which begins addressing the practical questions regarding the content and structure of the audit, e.g. are these concerns addressed in the current draft and, if not, how do we incorporate them?

1.2.6 Preparedness audit for epidemics

The second participatory activity was the presentation of the draft preparedness audit and a group discussion of primary challenges and opportunities related to the audit. Figure 2 shows a picture of the audit presented and edits made during discussion.

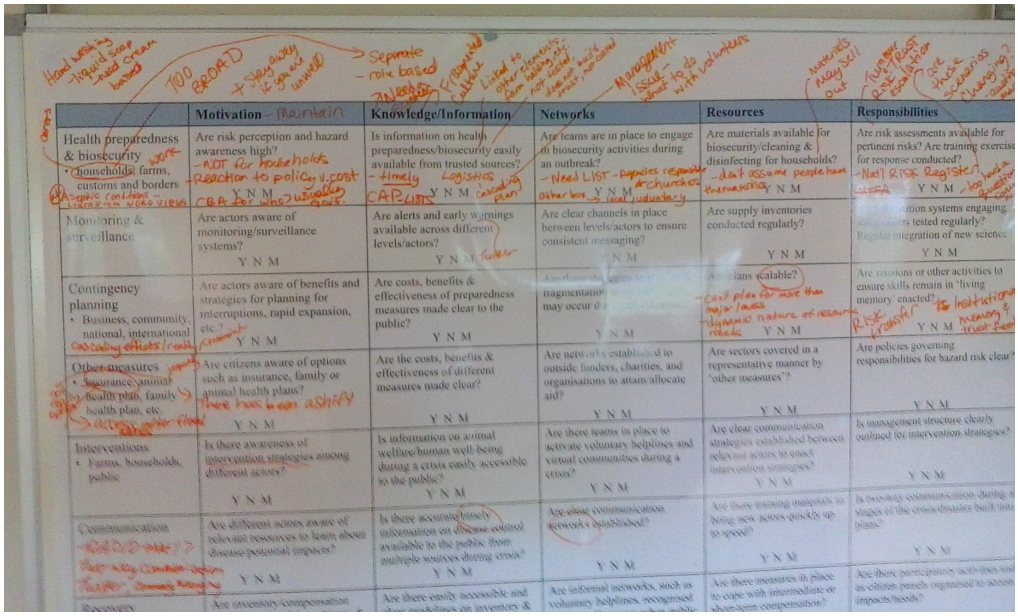

Figure 2: Picture of the preparedness audit and recommended edits made by participants.

The general categories of the epidemics preparedness audit included:

- Health preparedness (including bio-security)
- Contingency planning
- (Disease) intervention strategies
- Communication
- Recovery

Within each category, the general components of preparedness (e.g. motivation, knowledge and information, networks, resources, and responsibilities), established through TACTIC's preliminary research (Shreve et al., 2014) and first workshop meeting with disaster managers and practitioners in Krakow, Poland, were used as subcomponents of more detailed categories of preparedness (Box 2 provides short summaries of the preparedness components). The assumption here is that preparedness is enhanced when more of the preparedness components are covered.

Box 2: TACTIC's components of preparedness.

Knowledge/information: 'Knowledge' includes knowledge about the hazard as well as about actions that can be taken to prevent, respond to and mitigate its potential consequences. Knowledge is communicated through 'information'.

Motivation: 'Motivation' relates to the general willingness to take notice of and address hazard-related risks. Without motivation preparedness actions are unlikely to take place or be sustained.

Networks: 'Networks' relate to the possession and exploitation of social capital, for example distributing both financial and human resources.

Responsibilities: 'Responsibilities' relates to the distribution of tasks between public and private actors as well as ability or access to participate in decision- and policy-making processes.

Resources: 'Resources' include both financial resources (e.g. finances, land, physical material, buildings, etc.) as well as human resources (e.g. number of personnel and skills). Resources describe the means to be able to know, be motivated, establish networks, and to be able to act.

Whilst we found that the preparedness components were largely representative of the literature review, we further refined the main components with subcomponents that emerged across hazard types listed below:

- Social norms (e.g. attitudes, beliefs, biases)
- Cultural norms (e.g. collective beliefs)
- Personal resources and emotions (e.g. self-efficacy, trust)
- Social support resources (e.g. community based organisations, professional/employment resources, collectives, other networks)
- Responsibilities (e.g. personal such as childcare, elder care; willingness to work; legal roles and responsibilities)
- Knowledge/information (e.g. information on protective measures, including reliability, cost, efficiency and responsibility; knowledge gained from prior hazard experience; information systems, e.g. collection and dissemination on physical, social and environmental dimensions of hazard risk; language used for risk communication; manner of engaging with risk communication)

The draft of the epidemics preparedness audit is designed initially for organisations or practitioners tasked with disaster risk management, thus a different context compared to community level or individual audit assessment. Table 3 summarizes the key points and discussion regarding the draft of the epidemics preparedness audit.

Table 3: Epidemics preparedness audit example questions and key recommendations.

Motivation	Knowledge & Information	Networks	Resources	Responsibilities
Example questions: Are individuals aware of the hazard risk? Do they have a realistic view of the hazard risk?	Example questions: Is information on preparedness practices & efficiency of preparedness measures readily available?	Example questions: Is there adequate access to health care networks (e.g. GPs, veterinarians, other health service providers)?	Example questions: Are resources available to engage in preparedness activities (human and physical)? Are contingency plans scalable, e.g. able to expand and acquire more resources to meet demands?	Example questions: Are legal responsibilities for preparedness behaviours clear?
Key recommendations & comments				
Households need a different framing/context, as response will be quite different at this level; the audit should be clear regarding the perspective for motivation, e.g. preparedness for whom?	Information on the efficiency of preparedness measures could be quite useful. For the example of bio-security, this type of information is lacking. Delivery of risk communication needs to be timely, e.g. example of bio-security videos delivered long after citizens were already engaged in bio-security.	This should also cover informal networks e.g. voluntary helplines and support services, or ad hoc community messaging or engagement. From discussions in the first activity, there needs to be some indicator of flexibility (e.g. to cope with fragmentation)	It was noted that you can't really plan for epidemics/pandemics past a certain scale, e.g. past major or mass emergencies. However, you can recognise that an emergency could escalate to this level. Plans need to include methods for accessing local knowledge, especially when brining in support resources from outside of the local area.	Institutional turnover, politicization, and issues of trust emerged as key concerns relating to responsibilities that need to be further explored.
The good practice library should contain lessons learnt for motivating a culture of preparedness, e.g. 'staying at home when you're sick'	Knock-on effects of different preparedness actions should be acknowledged where possible, e.g. using cream based soaps could avoid secondary skin conditions. Also with regards to cascading effects of different intervention strategies.	It would be useful to advise on generating a checklist of different actors and networks and linking this to responsibilities.	Lessons learnt from public health, for example, utilizing hospital resources under scenarios from different outbreaks such as Ebola would be useful for the good practice library.	It was noted that legal responsibilities weren't really addressed during the discussion due to time constraints and this is an area to follow up on.

1.2.7 Summary: Epidemics preparedness audit

Developing audit questions for epidemic preparedness from multiple perspectives and levels is a very challenging task. While some may be engaged in contingency planning, individuals or other actors may not be engaged in decision making for contingency plans, which could

affect their risk level. Epidemics and pandemics, both human and animal, frequently necessitate top-down preparedness planning, but despite this, helping individuals, communities and organisations to remain aware of hazard risks, informed of the effectiveness of different preparedness measures, and ensuring networks are in place to readily communicate with decision-makers, can lessens the negative impacts of epidemics/pandemics.

1.2.8 Risk communication methods and goals

The final workshop activity on risk communication examines specific communication methods and goals, exploring practical aspects linking preparedness needs to communities (Figure 3). The aim of this exercise was to identify the primary methods of communication used to achieve different risk communication goals.

Figure 3: Participatory risk communication matrix activity. The aim of the activity was to understand what methods of communication were used to achieve different risk communication goals during the 2001 FMD event.

1.2.9 Summary: Risk communication activity

In contrast to natural hazards, it was identified that additional categories of 'communication goals' such as disease control, would need to be considered. Radio emerged as an important method of communication across different risk communication goals throughout the full disaster management cycle. It was also discussed that, looking back at 2001, personal computer and social media usage was much lower. Since 2001 many more people are utilizing Internet and social media, which can further enable risk communication. However these are sensitive to power outages and, in many parts of Cumbria, poor connections. Drawing from earlier activities and discussions, considering methods of communication or lines of communication to decision-makers throughout all stages of the crisis is an area requiring further consideration, especially for epidemics as public meetings or other public gatherings can increase the risk of spreading the disease.

1.2.10 Summary Lessons Learnt or to be learnt

Some of the key lessons learnt from the workshop are summarised below.

- Anecdotal evidence recommends that differential impacts of the 2001 FMD crisis were not adequately assessed or portrayed in many of the formal lessons learnt reports.

- Thought should be given in disaster plans as to ways in which the influx of resources during an epidemic/pandemic can benefit a community or at least partially balance disaster losses.

- Examples of successful voluntary organisations such as Pentalk can be utilized as case studies for lessons learnt regarding good practice for identifying and addressing communication needs during an epidemic/pandemic.

- An important lesson to learn from the 2001 FMD compensation example is that recovery allocations and costs should be more thoroughly examined to ensure fairness and avoid wastage.

- In the 2001 FMD crisis, there seemed to be a disconnect in the area of engaging public health expertise to address potential public health impacts of 'animal' diseases; an important lesson to be learned for future 'animal' epidemics/pandemics.

- Public health needs arising from the disaster may not always be reflected by formal health care services alone, including informal services such as voluntary helplines or other crisis counselling services, some of which may spring up during the crisis, can help create a more comprehensive record of impacts.

- The importance of hosting social events in affected areas after the crisis is an important lesson to be learnt, as well as the acknowledgement that people may prefer not to be reminded of a crisis after recovery and preparedness efforts should be respectful of this, focusing on the future and mindfully incorporating lessons learnt.

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