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Deposited in DRO:

11 August 2014

Version of attached file:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Dominelli, L. (2013) 'Mind the gap : built infrastructures, sustainable caring relations, and resilient communities in extreme weather events.', *Australian social work.*, 66 (2). pp. 204-217.

Further information on publisher's website:

<http://dx.doi.org/10.1080/0312407X.2012.708764>

Publisher's copyright statement:

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Mind the Gap: Built Infrastructures, Sustainable Caring Relations and Resilient Communities in Extreme Weather Events

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Abstract

Climate change debates seldom link the insights derived from the physical sciences to the concerns of social scientists. Understanding how failures in built infrastructures increase the caring burden on women is one of these instances. This article draws on a pilot study on climate change and older people to demonstrate that women who provide informal care services are called upon to fill the gap between declining levels of formal care provisions and care needs when the infrastructures serving a community fail. This research challenges policymakers, emergency planners and practitioners to think about the increased care burdens that women are expected to undertake during disasters involving extreme weather events like heat waves, cold snaps and flooding and reconsider policies that pass this responsibility down to the level of community without the necessary support services and built infrastructures being in place. This issue acquires additional urgency in the context of declining levels of care being publicly funded through the age of austerity as public expenditure cuts begin to bite.

Introduction

Research into disaster interventions including those linked to climate change and extreme weather events typically follows disciplinary boundaries, with scientific discourses rarely crossing these. Physical scientists tend to focus on physical vulnerabilities and the material aspects of a disaster while social scientists concentrate on the social dimensions, particularly the socially constructed vulnerabilities that arise from structural inequalities and resource shortages that undermine individual and community resilience during disaster scenarios. Consequently, insights gained in one scientific domain are not usually passed on to the others and policy-making and practice suffer from the less informed decisions that result. I attempt to bridge this divide in this paper by exploring the implications of failures in the built infrastructure for caring relations, particularly those involving elder care in two small, ethnically homogeneous mining villages in England. I do so by drawing upon an EPSRC (Engineering and Physical Sciences Research Council) funded project called the Built Infrastructure for Older People's Care in Conditions of Climate Change Project (BIOPICCC) in which a multidisciplinary team is exploring extreme weather events, defined as heat waves, droughts or extreme cold spells. BIOPICCC is a collaborative venture between two universities – Durham University in Durham, England and Heriot Watt University in Edinburgh, Scotland and a range of stakeholders interested in building capacity for sustainable responses to extreme weather events among older peoples, their communities and health and social care service providers. The research team consists of experts in the engineering and physical sciences, and the social and geographical sciences including health and social care (1).

BIOPICCC focused on the impact of flooding, coastal erosion and extreme weather events on the built-infrastructure and health and social care provisions for older people defined as those aged over 65. The Project has two case studies, one based in Northern and one in Southern England, covering both rural and urban areas. For the purposes of this paper, I focus on a pilot study undertaken in two rural sites where gender relations and informal caring came up as crucial themes meriting examination in their own right. The lack of attention given to women's roles and gendered relations during disaster interventions had been identified by Morrow and Enarson's (1996) study of Hurricane Andrew in the USA. The BIOPICCC pilot study's findings highlighted the themes of the invisibility of gender in both formal and informal caring relations and their significance in enabling older people to survive floods and extreme cold spells when crucial parts of the built infrastructure, especially the roads and transportation systems failed.

I conclude by posing a question for further research: Will informal care services provided mainly by women working within the family and/or as volunteers be able to sustain their capacity to fill the gap in provisions left by the extensive reduction in publicly funded provisions? This query is particularly pertinent in the UK where the Coalition Government of 2010 has initiated extensive cuts in welfare spending. The prospects are worrying because the care of older people consumes 40 per cent of local authority budgets. Moreover, a 26 per cent cut in overall expenditures means that the gap between the care that can be provided and the needs to be met will be considerable. A policy of slashing public monies from the welfare state has given rise to an age of austerity that John Ransford, the Head of the Local Government Association, predicts might last between 10 and 20 years (Brindle, 2011). This poses questions about the sustainability of informal care as a long-term gap-filler and carries enormous implications for gendered caring relations as well as the relationship between individual citizens, their human rights and the state as a care provider.

Methodology

A literature review enabled BIOPICCC to position itself in the field and ensure that the research questions focusing on the care of older people during extreme weather events were appropriate. The pilot study was conducted in the summer of 2010 in two rural former mining villages in Northern England. To preserve their anonymity, I gave them fictitious names. One village - Hill Top, had a population of 4000, while Valley Bottom had 1000 inhabitants. Both sites had been affected in the recent past by floods (2000 and 2008), heat waves (2003) and cold snaps (2009, 2010). The villages were 5 miles away from the nearest town and in fairly isolated locations, though next to each other. There was one major road running parallel to the river near Valley Bottom which was prone to flooding and another one several miles to the north of Hill Top which became very treacherous during cold spells. These roads linked the two villages to the rest of the country. Otherwise, they had to rely on a network of secondary roads.

Between them, these villages had a reasonable level of service provisions for small rural areas. These included: domiciliary care services funded by the local authority; district nursing services; a range of independent sector care services; a local GP surgery and pharmacy; a 'Live at Home' scheme run by local volunteers; an Age Concern daycentre; a warden sheltered housing scheme; mobile wardens who support those who could not attend the out-of-home facilities that were provided. Additionally, all these services were connected through the local authority's telecare service; meals on wheels; and a mobile library.

The pilot aimed to test the research tools and questions and identify issues that might crop up in the research. To obtain the interview sample for this pilot, snowballing techniques were used, relying on community organisations catering for older people, and the local adult care and emergency services. The pilot study involved 6 in-depth semi-structured interviews with older people whose ages ranged between 66 and 81 and had vulnerabilities covering mild dementia and mobility problems; meetings with key informants including local authority personnel, emergency response teams, utilities companies and civil society organisations; telephone interviews of a sample of key informants in the local authority; and two focus groups consisting of carers and emergency planners. The pilot also helped to develop the criteria used in determining the two areas chosen for the major in-depth case studies. The data collected in the interviews and discussions were transcribed and analysed thematically. For this paper, I re-examined the transcripts, drawing out the theme of gendered caring and supplemented this through a key word search that highlighted gendered relations and informal caring, e.g., son, daughter, spouse, family, relative, friend, neighbour, community. I quote respondents' own words to give voice to their perceptions.

Conceptual Framework

The concepts used to assist in the analysis of the data for the purposes of this paper were those linked to caring relations, gender relations, social capital and resilience. Gendered relations are important in exploring the position of men and women in caring relationships, identifying the roles that each category plays in looking after others, examining older people's entitlements to formal and informal care; and analyzing the relational patterns of care that emerge (Sevenhuijsen, 1998; Williams, 2001; Noddings, 2002a,b). Unpacking the notion of caring relations is important in exposing the ethics of care, the expectations that underpin these relationships and how they are carried out in order to link them to an analysis of gendered relations. In the relational space that caring relations create, the division between informal care and formal care becomes important in the experience of service users (Chambers and Phillips, 2008). These caring relations also highlight the right to be 'cared for' by others and the right to 'care about' others (Knijn and Ungerson, 1997). The concept of social capital is significant in making sense of how people within families and communities commit to caring for one another and how they then enact these responsibilities within a web of relationships that extend beyond caring relations to engage with issues about power relations, resources, poverty and entitlements to services, especially for poor and marginalised people (Dominelli, 2006; 2012).

Putnam (2000) suggests that social capital is about connections and trust between people who may or may not be related. It acts as a kind of glue that holds people together and consists of:

- Bonding social capital which draws on relationships of trust between family members and close neighbours and provides the basis for mutual assistance;
- Bridging social capital which connects people who are in the same geographic location, but are not usually related to each other; and then Woolcock (1998) added
- Linking social capital to convey the idea that social networks can extend beyond the local community and range spatially from the national to the international levels.

The connectivity provided by social capital is crucial in enabling people to access resources that they do not hold and in creating and/or widening their social networks of support and sustaining these over time (Noddings, 2002b). Under the system of neo-liberalism, the connections provided through social capital and its networks are, essential in enabling individuals, families and communities to cover the gap left when the state withdraws from service provision or fails to provide them. However, these discussions are silent on the gendered assumptions made about who provides care and oils the wheels of social connectivity that enables caring for others to proceed (Molyneux, 2002). This issue becomes particularly important for countries like the UK where people have become accustomed to having a welfare state that cares for them through formal caring relationships as a part of its obligations to its citizens (Williams, 2001) and which is unravelling now as a result of the fiscal crises that began in 2007-2008 and the ensuing age of austerity. The gap in caring provisions left by the withdrawal of the state can become a crucial issue for carers as these begin to bite. Adult care comprises 40 per cent of their expenditures (Brindle, 2011) and with local authorities facing a budget cut of 26 per cent between 2010 and 2014, the question must be asked, who will fill the gap?

This situation is made worse by the public sector having lost 143,000 jobs during 2011. Most of these workers will have been women and primarily involved in delivering services. Their departure will also carry huge repercussions for the care of older people (Chambers and Phillips, 2008). A high level of reduction in either budgets or staffing levels will impact badly on service provision for older people and will aggravate the vulnerabilities of those who already are unable to access services in their communities unless their needs are viewed as 'critical' or severe by those helping professionals who retain their jobs. Losses of such magnitude also raise concerns about the sustainability of care, and the impact of social policies in the caring arena on people's human and citizenship rights especially if current service users have to rely on voluntary sector activity and services provided in the domestic arena of the family in lieu of the state. Articles 22 to 27 of the Universal Declaration of Human Rights (UDHR) to which the UK, like the rest of the world is a signatory, requires governments to provide for people's social care. These factors must be borne in mind when reading the responses of older people picked up in the pilot study below because at the time of the study in 2010, they were generally satisfied with the formal provisions they received and the evacuation procedures put in place during flooding events. However, the measures that were to bite into health and social service provision were not anticipated to begin to have devastating effects until after 2011.

Resilience is an emerging property that entered life as a concept utilised in engineering and subsequently entered the social sciences, particularly those involved in managing crises, especially in eco-systems (Manyena, 2006). Resilience has been redefined 'as an active concept referring to the capacity of systems - natural, human or hybrid, to sustain themselves when confronting endogenous and exogenous shocks to an existing state' (Dominelli, 2012: 97). Moreover, resilience has non-linear and fractured characteristics that can result in a system becoming resilient along one dimension, but not in another. And, resilience can vary over time as the context changes. Resilience within gendered caring relations relies upon a partnership between formal and informal care providers and draws upon a web of relationships that are maintained by women. Women can be the losers as well as the beneficiaries of relationships that are carved out in gendered spaces (Goldstein, 2003).

Findings:

The research revealed that the older people had been affected by floods, heat waves and cold spells. During these extreme weather events, the built infrastructure became unreliable, particularly the roads which became impassable during flooding because cars blocked the main entry route into the villages and the cold snaps due to a lack of grit and sand. The research participants told us that older people had endured: power failures mainly affecting the electricity supply; inaccessible roads; disrupted communication systems; insufficient and inadequate emergency equipment; compromised housing and/or buildings; blocked drains; damaged sewers; and a failed water supply. However, when asked a direct question about their satisfaction with council services, most felt that they were satisfied with the care and attention they had been given at crisis points, e.g., during an evacuation; and in their normal care, if they needed it.

Failure in the built infrastructure also impacted upon those delivering care services, especially if they did not live in the villages because they were unable to reach the service users as required. The interviewees reported that carers did not turn up; that refrigeration necessary for protecting their medicines, e.g., insulin, was out of order; and oxygen equipment would not work. This compromised their health for a period until help, primarily from the locality and much of it informal, arrived. Women were also particularly active in community organisations and the community centre that provided a place of safety during the floods. Their involvement focused on everyday life routines that older people wished to retain. As these were able to continue as normal, it accounted for their satisfaction with the care they received during extreme weather events, especially the floods and cold snaps.

These findings also revealed the importance of the strong sense of community and access to social capital and social networks evident in former mining communities. Although some agencies held 'risk registers' that identified vulnerable older people, they complained that data protection legislation around confidentiality requirements impeded information sharing and had knock-on effects upon the coordination of assistance and/or provision of services.

The carers who stepped up when formal services were unable to arrive lived locally and were mainly women. As women were the main providers of this care, social capital at the community level exposed the gendered nature of informal care and how women came to the rescue when the other systems had failed. Although ignored by Putnam (2000), women's capacity to pick up the pieces as such times was seen as 'natural' and expected. As one respondent said:

'I don't get any help, nor meals-on-wheels. But I've got a daughter you see and she does everything'.

Although this research participant's son also lived nearby, the expectations on him were not the same as those for the daughter. It seems that women are drawn in through bonding social capital that operates at the level of the family and the community. When they provide these caring services, they create the bridging social capital that enables people to 'get by' in the absence of formal provisions. Such expectations are likely to increase during the age of austerity as the state reduces its involvement in service provision.

The following quote from a service provider captures the mood of all those carers in the locality pulling together to ensure that known needs were met during the crisis when formal providers were unable to get through to older people: One provider commented that:

‘Ninety per cent of the workforce is localised so most of the people who deliver the service in [Hill Top and Valley Bottom] actually live here...we were able to continue to deliver the service on foot. That’s the only reason we’ve been successful...we were relying on good will because people had to come out when it wasn’t their day to work’

The altruism displayed in the above quote is an important part of the civic duty that forms part of social capital so prized by Putnam (2000).

Moreover, public service workers, especially domiciliary care workers replaced independent sector ones who lived out-of-area when the roads became impassable. Thus, the public sector came to the assistance of the private one, even though the private provider had a commercial responsibility for providing the care. And, while those doing the caring were women, the first response emergency teams were comprised mainly of men.

Moreover, our research revealed that older people related the impact of failures in the built infrastructure during extreme weather events to their everyday life routines where caring relations are enacted. They claimed that this meant that they became worried about:

- Being warm and comfortable;
- Being safe in their own homes;
- Having their medicines and medical equipment available for use as needed; and
- Having a ‘centre’ to village life.

The last point related to the destruction of village life as part of the economic decline in the area, especially after the mines were closed during the Thatcher era. The disappearance of village amenities had continued to the present, with the recent loss of the Post Office as the hub of the village being of particular concern. One interviewee encapsulated this point of view by saying:

‘The Post Office was the centre of village life. If I hadn’t been in for a week they’d phone up to see that everything was alright. Now that’s gone.’

This epitomises the loss of social capital as connectivity which is important in forming bridging social capital that can provide caring services when other sources are unavailable. Also, these realities reveal that those on the spot become responsible for determining response priorities.

Another concern voiced by the older people was the failure of formal emergency service providers to learn lessons from earlier calamities and focus on preventative measures that could have improved service provision during subsequent extreme weather events. Additionally, their responses indicated that older people did not sit back and wait for the state to deliver care services to them. Instead, they drew on local social capital to do this.

Extreme weather events typically engage emergency experts, practitioners, politicians and local residents in managing the risks and uncertainties associated with these. One danger in the

expert-led approach is that it sidelines local citizen-based knowledge and participation. Consequently, experts dominate proceedings and indulge in what Dupuy (2005) defines as ‘enlightened catastrophism’. Ironically, the BIOPICCC pilot study indicated an alternative scenario. When formal carers were unable to fulfil their functions during a cold weather snap that curtailed transportation in the rural areas involved, informal caring amongst local citizens, saw family members and neighbours living nearby come to the rescue and ensure that older people took their medicines, had food to eat and warm homes to stay in. This citizenry provided similar assistance to older people during the earlier floods as well, suggesting that informal care that is embedded in a particular locality is more sustainable and reliable than that relying on high-tech equipment and formal out-of area providers. However, it adds to the amount of work done by women and the burdens they carry during disaster interventions (Dominelli, 2012). Although these symbolise gendered stereotypes, the gendered nature of caring relations and gendered enactment of social networks that draw upon existing caches of social capital and the capacity of women to care, it is important that men are also included in caring tasks.

The silence around gendered relations and the assumption that it would be women who would undertake the caring work in both formal and informal community level provisions surfaced in the interviews of key informants and in the focus groups. One service provider exposed the assumption that women would provide care when reporting that:

‘I was out in the New Year, walking from a relative’s house who wasn’t well and I met a man who said ‘I have a father-in-law’ who is terminally ill and I know the care company is not going to get in’ ...and I said ‘What are you going to do?’ He said, ‘I know a girl in this village who will turn out’‘We’ll make a phone call and we know we’ll be covered’....A very close community, which is good, but it doesn’t work everywhere.’

This passage highlights the normality of gendered assumptions and its limitations. Their being part of the norm means that these can be taken-for-granted rather than interrogated. In the case of older people, this gender silence is surprising given that the majority of older people are women, as are the majority of carers (Phillips, 2007). But, it depicts a ‘one size fits all’ mentality amongst service providers which also reduces the costs of providing care that is tailored to individual needs. However, the UK’s policies of personalisation and individual budgets whereby service users purchase, manage and administer their own care might enable a person to cater for specific needs. At the same time, there is an expectation that when the service user becomes both employer and consumer of those services for which s/he employs others, the state’s share of the costs of providing care will be less. I term this the *domestication of public care*.

The invisibility of gendered caring relations is evident at all levels – from service providers to community residents; from the older people needing care to the women who provide it. The taken-for-granted gendered assumptions of the fire fighter quoted below reveals that older women are ignored as decision-makers, although they outnumber men in this category:

‘So there are three basic, three main top groups we look at, and that is the injured, the elderly [sic] and infirm and the other ones which are normal residents who would not leave their property because they do not want to...[b]ecause the Englishman and his castle...you know’.

The focus on communities becomes another lens through which resilience, defined as their capacity to cope with the risks encountered during extreme weather events, uses gender neutral language to filter out the gendered nature of caring relations and their heavy reliance on women's labour. One community support officer commented upon the importance of resilience in the domestication of public care as follows:

From the resilience side of things, the vulnerable people is a big issue for us particularly ... for those people that aren't captured on anybody's radar. You know on social care or health lists or anything like that in this particular village [name] we have done more work because of the flooding. We have limited resources so we do things on a risk basis. So we have the flood warden scheme here, which would pick on people that have vulnerabilities and it is that kind of thing we will look to duplicate elsewhere from a community resilience point of view....around having people in the community that know their community. It's basically going back to the old fashioned ways of years ago, where neighbourliness and that kind of thing are there. Certainly, from the Council we have been promoting that. We're trying to look around the communities and have people in the communities that know their community, so that people don't get kind of lost.'

Resource scarcities result in formal provisions being made primarily for those lacking social bonding capital to step into the breach. As one provider stated:

'A lot of people will go and stay with friends and relatives. And what we'll normally do is set up some form of reception facility.'

Having informal carers in the community to fill the gap left by formal providers is explicitly included in planning processes, even if it is talked about in gender neutral terms. As one service provider claimed:

'when a person is being assessed we'll be asking about whether it is a family member or whoever, about what support they are willing and able to actually provide to that person. There is no sort of judgement made that someone must provide something for their loved one, but we would ask them because we don't want to take that care away either. But it is important from that kind of area that this is something we think about – it is part of the contingencies.'

Such planning includes the formation of climate change working groups that examine risk and prioritise vulnerable groups and actions linked to reducing their vulnerability. Resource availability drives much of this planning. Service providers are aware that resources are scarce and proactively think about how to manage the tensions between resource availability and anticipated needs. In the context of austerity planning, their end message is the difficult one of 'look after yourself' while simultaneously ignoring the gendered nature of the care task being delegated to individuals (and their families and communities). As one service provider explained:

‘We [the organisation] are a very, very small resource. Our plans rely on the wider Council including social care services. So if these are cut and there is an event and we need to rely on these services, then there will be a knock-on [effect] for how we can respond to people. What it might do is push us further down the community resilience route and what we are going to have to do is a whole education programme and that in itself is very resource intensive so I’m not sure where we will get the resource to deliver the community resilience aspect of the work, but we will have to get the message out about people helping themselves. Self-help will become more and more important and we will have to get the message out about that.’

These formal responses display how ideas about environmental citizenship - a person’s right to a safe environment and participate in decisions made about it and the realisation of environmental justice are circumscribed by the lack of resources and re-focus policies to avoid the formation of environmental victims or people suffering from failures in the built infrastructure and geosphere, by relying on self-help. Yet, victims continue to be produced as long as additional resources are not forthcoming, e.g., the shortage of sophisticated water pumps for flood waters meant that one group’s need for pumps during extensive flooding in the region could only be met at the expense of another. As one victim-survivor of these floods said, ‘if we hadn’t had [the big sophisticated pump] here, it would have gone to [name of a large flooded town nearby]’. This reality highlights the vulnerability of these communities in a context of scarce resources alongside their social exclusion from the national community of citizens who are entitled to the social care provisions identified in national legislation and under the Universal Declaration of Human Rights. In this context, to serve its citizens, the state has to find ways of incorporating and encompassing all citizens in a national polity if it is to enact an ethics of care that: addresses the vulnerability of all (Paperman, 2003); transcends the ‘ecology of fear’ (Davis, 1998) or concern about the reliability of the landscape arising from its destruction by industrial and/or natural processes; and enables populations to express citizenship as ‘the right to have rights’.

Social vulnerabilities rooted in low incomes and poor quality social networks hinder older people’s access to economic resources, built infrastructures and their distribution. Assessing social vulnerability amongst older people requires the transcending of standard measurements and analyses of exposure to biophysical vulnerability and natural hazards to take account of social resilience and access to formal and informal infrastructural support capabilities and social capital. Integrating social science research on social vulnerability with emergency planning and risk decision management is needed more than ever (Schmidlein et al., 2008).

At the same time, as one of the older people interviewed commented, providing emergency care occurs within the context of normal everyday caring routines that fall upon the shoulders of women:

‘Well it’s my daughter you see. She comes every morning at nine o’clock and sees to us – makes my breakfast and everything. I go in the shower and get dressed and have my breakfast. She took me shopping yesterday....She takes her husband to work in the

morning, then the kids to school then she comes to see me. I've got a good daughter. My son...loves us; he gives us a hug.'

Caring for people at the level of community was also devolved onto women. As another interviewee declared:

'The woman who coordinates it [the neighbourhood support scheme] ... was very, very good in that [name] during the last two alerts she really has been incredible. You know, coming out, checking on people, you know, keeping in contact. We've had some sand bags delivered twice which is always quiet scary.'

The older people interviewed revealed that self-help rather than state support ensured that they had fans and cold drinks to keep cool during heat waves. The 2003 heat wave in Europe exposed the lack of formal preparedness for extreme weather events of this nature. It caused more than 50,000 Europeans to die, mainly in the Mediterranean basin. The UK had 2,000 deaths; Italy had 17,000; France had 15,630; Spain had 5,290; and Portugal had 2,310 (Robine et al., 2007). This heat wave highlighted the state's lack of political engagement with older people by framing them and other groups like them as disposable and existing outside social networks and the national 'imagined community' by leaving them to fend for themselves. European states' failure to deliver emergency services to poor older citizens contrasted to the American action during the 1995 heat wave in Chicago when local states tackled social isolation, power failures and lack of access to air conditioning which caused significant numbers of deaths among this group (Klineberg, 2001). European state activity favoured socio-technical bureaucratic responses that were unable to meet their citizen's expectations about the state's key responsibility in:

- Managing and coordinating disaster responses.
- Regulating those who provide services in disaster situations.
- Monitoring service providers to ensure residents' safety and enforcing the principle of 'do no harm', which is central to any humanitarian intervention.
- Developing preventative services before disaster strikes, in the reconstruction processes afterwards and in ensuring that these are maintained.
- Ensuring that all individuals receive the goods and services to which they are entitled as victim-survivors of a disaster like an extreme weather-event.

Despite these responsibilities, most states lack a comprehensive and holistic community-based approach to disasters like the 2003 heat wave. Their actions also revealed the failure of states to acknowledge the limitations of the market in providing the care services needed in complex situations where health status and social dependency exacerbate vulnerabilities (EA, 2007). As a result, dead bodies symbolised personal and collective suffering while the state sought to manage people's anger by trying to normalise the situation in ways that ignored older people's citizenship rights and entitlement to environmental justice. And, it reinforced gendered caring relations by offloading its duty to care for older people onto the family and community, mainly their women members. In the 2003 heat wave, these reactions prompted citizens' resistance to the state's attempts to normalise its non-response to the crises in care precipitated by the lack of formal provisions, especially in France where energetic campaigns ensued (Salagnac, 2007).

Conclusions

The anger resulting from the failure of the state to respond adequately to the 2003 heat wave in Europe, suggests that individuals will contest the state's attempts to normalize hazards and make them responsible for meeting all the risks these pose. Community groups decry this approach as the government offloading its responsibility of caring for citizens. This view was not upheld in the BIOPICCC study in England, where older people felt that the combination of self-help and informal care provided by women covered the gap left by failing infrastructures and formal care during extreme weather events they experienced. Having the capacity to respond to such shocks is deemed resilience, an attribute that the state expects all individuals and communities to acquire and promote through collective local action. This policy is currently being advocated in the UK through the New Localism Bill and Prime Minister David Cameron's idea of the 'Big Society'. The BIOPICCC pilot study reveals that as long as informal carers step into the breach, older people simply get on with their lives as best they can and their needs remain invisible. This reinforces their social vulnerability and invisibility as a group. That this caring is also provided primarily by women also remains invisible. Older people's vulnerability will increase if informal carers cannot meet the needs that the state does not. There is a limit to the extent to which social capital held mainly by women can be stretched to cover the gap in care left by the social state. Research question for the future are, 'What are the limits to informal care provision? And, can the gap between the care provided and what is needed be filled in an age of austerity?'

Notes:

- (1) For more information about BIOPICCC, please read:
Oven, K, Curtis, S, Reaney, S, Riva, M, Ohlemüller, R, Dunn, C, Nodwell, S, Dominelli, L and Holden, R (2011) 'Climate change and health and social care: Defining future hazard, vulnerability and risk for infrastructure systems supporting older people's health care in England', *Applied Geography*, 33(1): 16-24.

Jonathan Wistow, Research Associate with specific responsibility for organising the interviews, meetings and focus groups, has taken the lead in writing in detail about other elements in this part of the Project. This will be published under Wistow et al. (forthcoming). I have written this article because I have a specific interest in gendered caring relations which extends beyond BIOPICCC.

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