K4D Knowledge, evidence and learning for development

Secondary impacts of major disease outbreaks in low- and middle-income countries

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Question

What evidence exists regarding the secondary impacts of response and control measures to major disease outbreaks (e.g. SARS/H1N1/MERS/Ebola etc) in low- and middle-income countries with weak health systems or in pre-existing crises?

Contents

1. Summary

Major infectious disease outbreaks in low-and middle-income countries can have serious long-lasting impacts that go beyond the direct impact of the disease, to include secondary social, economic, health and political impacts. These impacts can result from response and control measures such as quarantines, travel restrictions, and social distancing, and can be short or longer term.

However, a review of available literature of major cholera and Ebola outbreaks since 2010 found that not much literature has focused on their secondary impacts (Lamoure & Juillard, 2020). More research is needed into the wider social, economic and political impact of major infectious disease outbreaks and the national and international responses to them (Calnan et al, 2018, p. 407). Much of the available evidence on the secondary impacts of response and control measures to major disease outbreaks in low- and middle-income countries focuses on the Ebola outbreaks in West Africa, and to a slightly lesser extent, the Democratic Republic of Congo. As not all major infectious disease outbreaks are the same (they may have different transmission mechanisms, latency, and mortality rates), the secondary impacts of another kind of disease may differ (Gatiso et al 2018, p. 2).

The available evidence regarding the secondary impacts of response and control measures to major disease outbreaks in low- and middle-income countries finds that they include:

Social impacts:

- Major infectious disease outbreaks can have a negative impact on social cohesion due to fear of contagion, breakdown of trust, and changes in behaviour that erode the social fabric of families and communities. Scapegoating of certain social groups such as ethnic minorities can also occur. The negative effects on social cohesion may be long lasting.
- Survivors, their families, healthcare workers, and others associated with the disease can experience stigmatisation, contributing to their social exclusion and economic marginalisation. This stigma can last long after the disease outbreak has ended.
- Education is negatively affected due to school closures or parents' reluctance to send their children to school due to fear of contagion. Months of schooling may be lost, and some children may find it hard to reenrol after the crisis has passed. Investment in the education system may be diverted to the response.
- Children can lose their primary caregivers (due to death, abandonment, or lack of measures put in place if their caregivers need medical care) and reduced caregiver supervision leaves them vulnerable to violence, exploitation and abuse. Teenage girls may need to take on additional caring responsibilities and may be vulnerable to engaging in transactional sex due to their family's financial situation. Children's births may not be registered.
- Women's social duties can make them more vulnerable to contracting disease. Their livelihoods may suffer due to time spent on caring duties or if the sectors they are concentrated in are hardest hit by the disease outbreak and its response. They may face increased sexual and gender-based violence.
- Response measures, such as quarantines, can have a disproportionate impact on the elderly, the poor, and people with chronic illness or disabilities.
- Existing aid programmes face new and sudden safety, security and access challenges. Trade-offs occur between the urgency of response and need to support long-term development. Existing funds and focus may be diverted to the response.

- Other social impacts include population displacement, human rights violations, and the cancellation of events.

Economic impacts:

- Economies and livelihoods are negatively affected by major infectious disease outbreaks, in both the short term and in the longer term after the crisis has ended.
- The immediate costs of the response can be high, and the fiscal stresses caused by these increased expenditures can be exacerbated by diminished tax revenues.
- Economic growth can decline as a result of major infectious disease outbreaks and the response. Fear-induced behaviour changes, such as avoiding workplaces and markets, causes economic disruption. The labour force can be reduced by sickness and mortality, and fear of associating with others. Quarantines, travel restrictions, bans, and the closure of markets and borders can disrupt trade and livelihoods.
- Some sectors may be particularly hard hit. Tourism is vulnerable to downturns during major infectious disease outbreaks, due to fears of contagion. This can extend to a whole region rather than just the affected countries. Agriculture was badly hit during the West African Ebola crisis due to the loss of labour and markets.
- The aid response has an impact on the local economy, raising prices and providing employment. This can cause resentment among those who miss out.
- Household incomes can decrease as a result the loss of wage earners to death, quarantine, or sickness, and the additional expense they may have in relation to healthcare. Their coping strategies can reduce future income opportunities and increase vulnerability to future shocks. Poorer households are especially affected as they have limited means to cope.

Secondary health impacts:

- Fragile health systems struggle to cope with regular health issues during major infectious disease outbreaks due to the diversion or depletion of funds, resources, and personnel from routine healthcare. Travel restrictions, infection control measures, fear, or a decrease in trust can stop people accessing health care facilities.
- This can lead to additional deaths from causes other than the disease, a decrease in routine childhood vaccinations, and a decline in maternal health services.
- The response can also put the future of existing health systems under strain. It takes time for the system to recover and return to normal once the outbreak has ended.
- The availability of healthcare workers and their ability to provide care decreases during major infectious disease outbreaks as a result of illness, deaths, and fear-driven absenteeism.
- The trauma of major disease outbreaks and the response measures can result in increased mental health problems, which can persist years after the epidemic has ended.
- Responses to major infectious disease outbreaks can disrupt livelihoods and food supplies, leading to malnutrition.
- Infectious diseases and the response can generate large amounts of waste.

Political and security impacts:

- Major infectious disease outbreaks can increase existing political stresses and tensions.
- Diseases that are sudden and acute, rather than chronic, that have a greater risk of death, and that lack clear scientific or medical knowledge and effective treatment options, are more likely to result in instability.

- Coercive outbreak responses can lead to protests, violence, and tensions between the state and citizens, especially when trust in the state was already low.
- During the West African Ebola outbreak, civil violence was more likely in the early stages of the outbreak, although the crisis was not as destabilising as initially expected.
- The situation may be politicised and used for political gain.
- Major disease outbreaks can lead to decreased trust in state institutions.
- If security forces are affected, this may affect the country's ability to manage instability. The effect on armed groups also needs to be considered.

A second companion paper (Kelly, 2020) looks at lessons learned from responses to these secondary impacts. These include intersectoral responses and co-ordination between NGOs and national governments, the importance of health systems strengthening, and cultural awareness to mitigate against stigma and the marginalisation of specific groups.

2. Secondary impacts in low- and middle-income countries

Major infectious disease outbreaks have occurred throughout history and appear to be increasing in frequency (Madhav et al, 2018, p. 316). Low- and middle-income countries are especially at risk, particularly as gaps may exist in relation to outbreak detection and response systems, such as the 'timely detection of disease, availability of basic care, tracing of contacts, quarantine and isolation procedures, and preparedness outside the health sector' (Madhav et al, 2018, p. 315). Countries affected by political instability, weak public administration, and inadequate resources for public health are also likely to be poorly prepared for major infectious disease outbreaks (Madhav et al, 2018, p. 320).

While major infectious disease outbreaks are generally seen as public health emergencies, they often have serious secondary impacts and 'cause significant economic, social, and political disruption' (Madhav et al, 2018, p. 315; Lamoure & Juillard, 2020, p. 3).The negative impacts are 'particularly profound in fragile and vulnerable settings, where poverty, poor governance, weak health systems, lack of trust in health services, specific cultural and religious aspects and sometimes ongoing armed conflict greatly complicate outbreak preparedness and response' (WEF, 2019, p. 3).

Survivors of Ebola in Guinea indicated that the 'the social and economic implications of experiencing the virus were as important as the implications for physical health' (Calnan et al, 2018, p. 405).

3. Social impacts

Social cohesion

Major disease outbreaks can have an impact on social cohesion (Lamoure & Juillard, 2020, p. 25; Calnan et al, 2018, p. 407). During the different Ebola crises for example, fear of contagion led people to stop shaking hands, to keep their distance from each other, to stop visiting others, and to limit their attendance at funerals (Alcayna-Stevens, 2018, p. 43; Lamoure & Juillard, 2020, p. 25; Santos & Novelli, 2017, p. 12). This led to people feeling afraid and isolated and to a deterioration in relationships and social cohesion (Alcayna-Stevens, 2018, p. 43; Santos & Novelli, 2017, p. 12). Advice to prevent the spread of Ebola was antisocial, in that family

members were ‘discouraged to touch their loved ones, or to mourn their departed and bury them according to custom’ (Ripoll et al, 2018, p. 6; see also Calnan et al, 2018, p. 407). The ‘‘epidemic of fear’ undercut trust within and between communities’ (Bonwitt et al, 2018, p. 172). Lack of trust ‘contributed to the erosion of the social fabric in many affected neighbourhoods’ (Lamoure & Juillard, 2020, p. 25; UNDG WCA, 2015, p. iv). For example, a ban on bushmeat lead to episodes of revenge reporting, and contributed to an atmosphere of fear and secrecy, which strained family and community relations (Bonwitt et al, 2018, p. 172). Calnan et al (2018, p. 407) found that the negative effects on social cohesion caused by the Ebola outbreak in Guinea continued after the crisis had ended.

However, social customs can also adapt to reduce transmission (Ripoll et al, 2018, p. 24, 43). For example, the ‘Ebola handshake’ in Liberia consisted of touching elbows instead, while traditions of drinking palm wine from a shared glass was adapted so that each person drank from a different glass (Ripoll et al, 2018, p. 23).

Existing social and political divisions may play out in an epidemic; for example, scapegoating between Muslim and Hindu communities in a plague outbreak in Surat, India, or of the Coptic Christian community in Egypt during the 2009 H1NI outbreak (Ripoll & Wilkinson, 2019, p. 18). ‘Cholera blame narratives can also serve to pit social groups against each other’ (Ripoll & Wilkinson, 2018, p. 11). Already marginalised groups, such as indigenous forest dwellers in Guinea, ‘interpreted the Ebola response as a further attack on them’ (Ripoll et al, 2018, p. 10). In Sierra Leone, there were concerns amongst the poor that Ebola money was being funnelled to elites (Ripoll et al, 2018, p. 10).

Communities that are unaffected by the major disease outbreak also need to be considered (Ripoll et al, 2018, p. 20). In the North Kivu Ebola outbreak for example, communities in eastern Congo felt neglected and frustrated by the government and international communities’ focus on North Kivu (Ripoll et al, 2018, p. 20).

Stigma

Survivors of major disease outbreaks, and their families and carers, have experienced stigma (Lamoure & Juillard, 2020, p. 25; Alcayna-Stevens, 2018, p. 41, 43; Ripoll & Wilkinson, 2019, p. 25; Ripoll et al, 2018, p. 16, 45; Calnan et al, 2018, p. 403, 406; ACAPS, 2015, p. 4). They are ‘often viewed by others as ‘guilty’ of not having respected health directives, or ‘dangerous’, posing a risk that the disease may spread again’ (Lamoure & Juillard, 2020, p. 25; Alcayna-Stevens, 2018, p. 42; Ripoll et al, 2018, p. 45; ACAPS, 2015, p. 4). During the Ebola crisis, healthcare workers, including local healers in some places, have also experienced stigmatisation (Alcayna-Stevens, 2018, p. 35, 43; Ripoll et al, 2018, p. 16; ACAPS, 2015, p. 4). ACAPS (2015, p. 4) identified some causes of stigma during the Ebola outbreak in West Africa, including that it was a new disease; that ineffective messaging led to myths and rumours; and due to the change in burial practices.

Social exclusion and economic marginalisation are often the result of this stigma (Lamoure & Juillard, 2020, p. 25; Alcayna-Stevens, 2018, p. 43; Ripoll et al, 2018, p. 16, 45; Kodish et al, 2019, p. 8; ACAPS, 2015, p. 5). Some survivors of the West African Ebola outbreak were ‘chased out of their communities, were evicted from their rented houses or were in conflict with their family members’ (Ripoll et al, 2018, p. 45; see also Calnan et al, 2018, p. 405-406). The stigma often continues long after the crisis has passed (Lamoure & Juillard, 2020, p. 25; Alcayna-Stevens, 2018, p. 43).

In addition, already vulnerable social groups, such as ethnic minorities or people living in poverty, have been stigmatised and blamed for the disease and its consequences (Madhav et al, 2018, p. 325; Ripoll & Wilkinson, 2018, p. 10). If major disease outbreaks are attributed to a particular region or country, this can generate or exacerbate stigma or scapegoating of particular social groups (Ripoll & Wilkinson, 2019, p. 18). For example, this happened for Asians in the case of the H5N1 bird flu epidemic and Mexicans in the case of the 2009 H1N1 flu (Ripoll & Wilkinson, 2019, p. 18). Minority populations linked to the disease foci have been shunned and socially excluded, even in countries where the disease has not spread to (for example Africans in Hong Kong, the US and Canada during the 2014 Ebola crisis) (Madhav et al, 2018, p. 325; Ripoll et al, 2018, p. 17). In the case of cholera, the stigmatisation of cholera-affected communities has generated significant distrust of the authorities and led to resistance to the response (Wilkinson & Ripoll, 2018, p. 10).

Education

Major disease outbreaks can negatively affect education in the short term and in relation to investment in the education system (Lamoure & Juillard, 2020, p. 24; Ripoll et al, 2018, p. 18; Santos & Novelli, 2017, p. 53). Disease response measures can interrupt education and during the 2014 Ebola epidemic in West Africa and the 2018 Ebola outbreak in DRC, schools were closed, or parents were reluctant to send their children to school, due to fear of contagion (Lamoure & Juillard, 2020, p. 24; Alcayna-Stevens, 2018, p. 17; Ripoll et al, 2018, p. 18; Santos & Novelli, 2017, p. 10, 12). An estimated 5 million children across Guinea, Liberia, and Sierra Leone did not go to school during the Ebola outbreak due to school closures (Fisher et al, 2018, p. 15). In Sierra Leone, schools were closed for so long that children at all levels of education missed a whole academic year (Ripoll et al, 2018, p. 18). Amara et al (2017, p. 22) noted an increased dropout rate among students and an increase in child labour as a result of the school closures. Bandiera et al's (2018, p. 4) study looking at girls and young women in Sierra Leone, found that even after schools reopened, teenage girls found it harder to re-enrol due to their involvement in income generation (enrolment rates fell by 16% in the most disrupted villages). In Liberia, schools were closed for seven months, which created problems after the outbreak ended due to 'lost curriculum for those that were promoted and the doubling of applicants to West African Examinations Council in 2016' (Santos & Novelli, 2017, p. 10, 14). Most teachers were without work while the schools were closed, although a number were involved in health awareness and social mobilisation workshops (Santos & Novelli, 2017, p. 12). The Ebola Protocols mandated a reduction in the number of students per class but this was either ignored or led to the rationing of enrolment in public education, which in turn 'pushed school age children and youth to private schools (bringing added strain on family finances) or out of school altogether' (Santos & Novelli, 2017, p. 14). Migration by affected populations to urban areas, 'increased pressure on the education system in these areas, particularly in the underserved slums' (Santos & Novelli, 2017, p. 11).

School closures also have an economic impact as they can result in workplace absences of children's caretakers (Madhav et al, 2018, p. 336; Fisher et al, 2018, p. 14).

In addition, resources intended for education may be diverted from education to respond to major disease outbreaks, which delays the investment needed for education (Santos & Novelli, 2017, p. 53). For example, in Liberia, UNICEF's Peacebuilding, Education and Advocacy (PBEA) programme was reoriented towards tackling Ebola from its original intention to 'reinforce the capacity of education to contribute to peacebuilding by reducing education inequality

experienced in rural communities' (Santos & Novelli, 2017, p. 53). While this seems to be the 'right decision at the time, there remains a huge amount of work needed in the education system for the sector to fulfil its promise and potential as an engine of peace and sustainable development' (Santos & Novelli, 2017, p. 60).

Impact on children

Children face specific risks during major disease outbreaks and their specific protection needs must be considered (Fischer et al, 2018, p. 9; Lamoure & Juillard, 2020, p. 24). They can lose their parents or primary caregiver and be left unaccompanied, especially if the family details of caregivers who die are not collected (Lamoure & Juillard, 2020, p. 24; Fisher et al, 2018, p. 10, 12). Reduced caregiver supervision, including while caregivers are being treated, can 'leave children more vulnerable to violence, exploitation and abuse' (Fischer et al, 2018, p. 10, 13). School closures, military presence and movement restrictions also contribute to increased likelihood of sexual abuse and gender-based violence against both children and women (Lamoure & Juillard, 2020, p. 24; AfDB, 2016, p. 30). During the Ebola crisis in Liberia, there were reports that some families did not visit their sick children or return for them once they'd recovered, while other children whose caregivers had died were rejected by their extended family (Fischer et al, 2018, p. 10). The reason for this abandonment 'stemmed from the families' fears of being shunned by their communities' (Fischer et al, 2018, p. 10). Children in Sierra Leone also reported feeling sad, lonely and lost without their peers during the Ebola epidemic (Fisher et al, 2018, p. 11).

During the West African Ebola outbreak, teenage girls 'assumed responsibility for caring for caregivers and siblings who had fallen ill putting them at greater risk of disease' (Fischer et al, 2018, p. 9). The financial impact on families also led to the 'engagement of adolescent girls in transactional sex to supplement household incomes' in Sierra Leone (Fisher et al, 2018, p. 14-15). Teenage pregnancies were reported to have risen during the 2014 Ebola crisis in Sierra Leone, as girls were spending more time with men, which also had an impact on their school enrolment post-crisis (Ripoll et al, 2018, p. 18; Bandiera et al, 2018, p. 4).

Quarantine measures are thought to have played a role in the sharp decline in birth registrations during the Ebola outbreak in Sierra Leone, where an estimated 700,000 children were not registered between 2014 and 2015 (Fischer et al, 2018, p. 15).

Impact on women

Due to their social duties, especially care giving duties, women have a higher risk of contracting some infectious diseases, such as Ebola (Alcayna-Stevens, 2018, p. 16; Ripoll & Wilkinson, 2018, p. 6; Ripoll et al, 2018, p. 15; AfDB, 2016, p. 11; Kapur, 2020, p. 2). In the case of Ebola in the DRC, women are often the ones who butcher meat or sell bushmeat at the market (Alcayna-Stevens, 2018, p. 16). In addition, they are also 'caregivers to the sick and must wash the bodies of deceased female relatives' (Alcayna-Stevens, 2018, p. 16). It should be noted that in some other contexts, it is men who are involved in preparing bodies for burial and transportation of the sick (Ripoll et al, 2018, p. 15, 40).

During the West Africa Ebola outbreak, women's livelihoods were particularly hard hit as women tended to work in industries such as agriculture and services that were hit particularly hard by the crisis and response, such as the closure of markets (AfDB, 2016, p. 11; UNDP, 2014, p. viii; Amara et al, 2017, p. 24; UNDG WCA, 2015, p. iii). In addition, the time they spent caring for the

sick was time in which they were ‘disengaged from productive work to sustain livelihoods’ (AfDB, 2016, p. 11).

An ethnographic study after the 2018 Ebola outbreak in DRC found that Ebola widows face particular challenges as the expectations placed on them during the mourning period meant that they could not attend vaccination campaigns and often struggled to provide for their families without their husband’s income or due to their husband’s debts (Alcayna-Stevens, 2018, p. 16, 39). Funeral costs can also be high and customary fines may need to be paid to their in-laws (Alcayna-Stevens, 2018, p. 40). This also had an impact on their ability to pay for school fees for their children (Alcayna-Stevens, 2018, p. 39). During the West Africa Ebola crisis, widows were also barred from ‘accessing their deceased husband’s land because of discriminatory inheritance laws’ (AfDB, 2016, p. 11).

The West Africa Ebola crisis resulted in ‘increased abuse, sexual and gender-based violence because of the pressures of [Ebola], as well as reduced access to justice mechanisms’ (AfDB, 2016, p. 11, 30; Amara et al, 2017, p. 24).

Impact on ethnic minorities

Ethnographic research into the 2018 Ebola outbreak in Equateur Province, Democratic Republic of Congo (DRC), found that Batwa hunters experienced stigmatisation when bushmeat was identified as the source of the outbreak (Alcayna-Stevens, 2018, p. 15; Ripoll et al, 2018, p. 16). ‘Messages which prohibit or stigmatize the eating or selling of game meat can be harmful to people’s health and income, because they may end up reducing their protein intake and unable to make money selling meat – they may have no alternative source of income’ (Alcayna-Stevens, 2018, p. 22).

Batwa also reported being excluded from response activities, or when they were involved as community health workers, they reported being underpaid compared with Nkundo/Bantu counterparts (Alcayna-Stevens, 2018, p. 15). Batwa families also reported less access to psycho-social support and food provisions compared to bereaved Nkundo/Bantu families (Alcayna-Stevens, 2018, p. 15).

Impact on other groups

Major infectious disease outbreaks and their response may have a greater impact on some groups. For example, ‘quarantines have had a disproportionate impact on the elderly, the poor, and people with chronic illness or disability’ (Rohwerder, 2014, p. 2). Although their focus is not on low- and middle-income countries, Campbell et al (2009), for example, note that people with disabilities, particularly those who require personal assistance, may be at increased risk during an influenza pandemic because of disrupted care. However, more research is needed into this.

Population displacement

Panic during major infectious disease outbreaks can lead to rapid population migration (Madhav et al, 2018, p. 325; Ripoll & Wilkinson, 2019, p. 20; Brahmbhatt & Dutta, 2008, p. 6). For example, an outbreak of plague in 1994 in Surat, India, led to roughly 20% of the city’s population (around 500,000 people) fleeing their homes, as the lack of accurate information and trust in the authorities led to heightened panic (Madhav et al, 2018, p. 325; Brahmbhatt & Dutta, 2008, p. 6). Such sudden population movements can have ‘destabilizing effects, and migrants

face elevated health risks arising from poor sanitation, poor nutrition, and other stressors' (Madhav et al, 2018, p. 325). Population movements also risk spreading the disease further (Madhav et al, 2018, p. 325).

Human rights

Major infectious disease outbreaks can have a detrimental impact on the human rights situation in affected countries, with 'significant negative effects on social, cultural, and economic rights of affected populations' (UNDG WCA, 2015, p. 69). Some response and control measures such as quarantines, travel restrictions, and closure of schools, workplaces, public transport and congregations to encourage containment, isolation and social distancing have negative outcomes in terms of human rights, such as freedom of movement and assembly, the right to culture, education, non-discrimination, and the freedom of religion, especially when the measures are forced (Ripoll & Wilkinson, 2019, p. 21; Campbell et al, 2017, p. 4; UNDG WCA, 2015, p. 20). Depending on the political and social circumstances in the countries, people may be more willing to voluntarily comply with these measures (Ripoll & Wilkinson, 2019, p. 21).

Cancellation of events

During the West African Ebola crisis, 'gatherings such as weddings, church meetings, funeral ceremonies and many communal activities were either abandoned or drastically reduced', which had serious implications for social cohesion and trust (Amara et al, 2017, p. 21).

On a larger scale, during the West African Ebola crisis, Morocco refused to host the 2015 African Cup of Nations (AFCON) due to their concerns about Ebola (Maphanga & Henama, 2019, p. 5).

Existing aid programmes

Major disease outbreaks can present challenges to aid agencies already working in the country, even if they are not working directly on the response (Reilly & Llorente, 2015, p. 26). Countries in which they had been operating may go from being non-high risk to 'now posing new and sudden safety and security challenges' and safe access to affected communities they were working with can be increasingly difficult (Reilly & Llorente, 2015, p. 26). During the West African Ebola crisis, non-medical organisations had to weigh up the risks of continuing their programmes and the risk to their staff and 'implemented new safety and security protocols and revised existing policies and contingency plans, notably insurance and medical evacuations for non-medical responders' (Reilly & Llorente, 2015, p. 27). The US Peace Corps evacuated hundreds of volunteers from the three affected west African countries (Agencies, 2014). Donors faced difficult trade-offs between the urgent need to fund the Ebola response and the 'continued imperative of supporting long-term development' (UNDP, 2014, p. 48). As noted in the sections below, the existing funds and focus on education, health or nutrition programmes, for example, were sometimes diverted to the response.

4. Economic impacts

Major infectious disease outbreaks can cause 'economic damage through multiple channels, including short-term fiscal shocks and longer-term negative shocks to economic growth' (Madhav et al, 2018, p. 316). However, the direct fiscal impacts of pandemics generally are small relative to the indirect damage to economic activity and growth (Madhav et al, 2018, p. 324). 'Individual

and societal measures to reduce disease spread can seriously disrupt economic activity' (Fan et al, 2018, p. 347). Fear of contagion and domestic and international disease containment measures, such as travel restrictions, quarantine, and closure of markets and schools, have economic effects (de al Fuente et al, 2019, p. 2). During severe cases 'all sectors of the economy—agriculture, manufacturing, services—face disruption, potentially leading to shortages, rapid price increases for staple goods, and economic stresses for households, private firms, and governments' (Madhav et al, 2018, p. 325; see also Amara et al, 2017, p. 6). This adversely affects the livelihoods of individuals, households, and communities (Gatiso et al 2018, p. 1). Major infectious disease outbreaks also affect people's livelihoods by weakening their physical, financial, social and natural capital (Gatiso et al, 2018, p. 3).

A 2006 study estimated that income losses from pandemics could exceed 50% of gross national income in some low- and middle-income countries (McKibbin and Sidorenko in Fan et al, 2018, p. 347). Estimated costs of past events include: a loss of over USD 40 billion in productivity from the 2003 SARS epidemic; USD 53 billion loss from the economic and social impact of the 2014-2016 West Africa Ebola outbreak; and the USD 45 to 55 billion cost of the 2009 H1N1 influenza pandemic (WEF, 2019, p. 3). 'Models predict the annual cost of a global influenza pandemic would mean that South Asia's GDP would drop by 2% (USD 53 billion), and sub-Saharan Africa's GDP by 1.7% (USD 28 billion) (WEF, 2019, p. 3). Fan et al (2018, p. 355) estimate the value of intrinsic loss from the excess deaths from potential pandemics to be USD 490 billion, or 0.6% of global income. The World Bank's 2015 economic growth estimates for Liberia was 3% (compared to a pre-Ebola estimate of 6.8%); and for Sierra Leone it was -2% (compared to a pre-Ebola estimate of nearly 9%) (Madhav et al, 2018, p. 324). Subsequent research found confirmation of the Liberian estimates (Santos & Novelli, 2017, p. 9). During the West Africa Ebola outbreak, the largest decline in the production of goods, involved those 'that had formerly been traded with neighbouring countries, that came from areas highly affected by the epidemic, or that involved in-person cooperation' (UNDP, 2014, p. vii). At an individual level, Ebola for example, resulted in loss of jobs and accommodation and a serious reduction in income (Calnan et al, 2018, p. 405). Research by Gatiso et al (2018) in Liberia suggests that the negative impact of Ebola on household incomes was also felt in communities which were not directly affected by Ebola. The economic impacts of epidemics often last long after the major disease outbreak has ended (Lamoure & Juillard, 2020, p. 22; UNDP, 2014, p. vii).

Direct costs and diversion of resources

The immediate response to major disease outbreaks can be expensive as resources flow to treatment and control measures, and governments can 'cut funds from other areas such as public works and by increasing the fiscal deficit' (Fan et al, 2018, p. 347; Brahmbhatt & Dutta, 2008, p. 4; Amara et al, 2017, p. 7). Public health efforts to contain or limit major infectious disease outbreaks (such as tracing contacts, implementing quarantines, and isolating infectious cases), as well as subsequent efforts, such as the construction of new facilities and increased demand for medical supplies, personal protective equipment, and drugs, can greatly increase health system expenditure (Madhav et al, 2018, p. 324). However, Brahmbhatt & Dutta (2008, p. 5) note that the large economic effects of the plague outbreak in Surat and SARS did not arise principally from direct medical costs.

Decline in tax revenues

The fiscal stresses caused by the increased expenditures due to the response to the major disease outbreak can be exacerbated by diminished tax revenues, especially in low- and middle-income countries whose tax systems are weaker and government fiscal constraints more severe (Madhav et al, 2018, p. 324). During the 2014 Ebola crisis in Liberia for example, 'while response costs surged, economic activity slowed, and quarantines and curfews reduced government capacity to collect revenue' (Madhav et al, 2018, p. 324). There was a 4.9-9.4% decline in government revenues in 2015 in Guinea, Sierra Leone and Liberia (WEF, 2019, p. 4).

Development aid

Overseas development aid can sometime offset these fiscal shocks, but during severe pandemics, affected high income countries may not be able to provide this aid, and low- and middle-income countries 'could face larger budget shortfalls, potentially leading to weakened public health response or cuts in other government spending' (Madhav et al, 2018, p. 324).

Foreign investment

A decline in foreign and domestic investment can also affect countries experiencing major infectious disease outbreaks (Lamoure & Juillard, 2020, p. 22; AfDB, 2016, p. 26; UNDP, 2014, p. viii). This can be due to the outbreaks and their response causing a huge rise in uncertainty, which discourages investment (UNDP, 2014, p. 15). The number of business visitors arriving at Lungi International Airport in Sierra Leone from January to June 2014 declined by 46.9% in comparison to the same period in 2013 (AfDB, 2016, p. 26).

Labour shortages

'Negative economic growth shocks are driven directly by labour force reductions caused by sickness and mortality and indirectly by fear-induced behavioural changes' (Madhav et al, 2018, p. 324; see also Fan et al, 2018, p. 347). In Sierra Leone, for example, the supply of labour was found to have declined as a result of deaths due to Ebola, 'the departure of expatriates, the burden of care on households, the migration of workers to escape the disease, and the unwillingness to engage in collective activities (as farmers refused to participate in the harvest and office workers stayed home from many private firms and public sector institutions)' (Amara et al, 2017, p. 21).

Fear based behaviour change

Brahmbhatt and Dutta (2008, p. 2, 7) found that the main economic effects of the Surat plague and SARS events arose as a result of 'the uncoordinated and sometimes panicky efforts of millions of private individuals to avoid becoming infected' which led to negative demand shocks. Madhav et al (2018, p. 324) note that the 'reduction in demand caused by aversive behaviour (such as the avoidance of travel, restaurants, and public spaces, as well as prophylactic workplace absenteeism) exceeds the economic impact of direct morbidity- and mortality associated absenteeism'. They suggest that 'individual behavioural changes, such as fear-induced aversion to workplaces and other public gathering places, are a primary cause of negative shocks to economic growth during pandemics' (Madhav et al, 2018, p. 316). Social distancing leads to the avoidance of places where economic activities occur (Madhav et al, 2018, p. 336). Changes in behaviour depend on people's subjective judgements on the risks posed by

the disease outbreak, which can be influenced by public information and risk communication strategies (Brahmbhatt & Dutta, 2008, p. 3-4).

During the 2014 Ebola crisis, fear of associating with others resulted in reduced labour force participation, closed places of employment, disrupted transportation, motivated some governments to close land borders and restricted entry of citizens from affected countries, and motivated private decision makers to disrupt trade, travel, and commerce by cancelling scheduled commercial flights and reducing shipping and cargo services (Madhav et al, 2018, p. 324; Amara et al, 2017, p. 6). The evacuation of expatriate staff in a variety of industries had a detrimental impact by undermining production (UNDP, 2014, p. 23, 25). Communities in DRC associated with Ebola were avoided by others, which has economic consequences for them (Ripoll et al, 2018, p. 17). The negative demand shock due the panicked population displacement during the plague outbreak in Surat, led to businesses in Surat losing an estimated USD 260 million in trade (Brahmbhatt & Dutta, 2008, p. 6).

Travel and cross-border trade restrictions

Responses to major infectious disease outbreaks have sometimes involved travel and trade restrictions, in an attempt to stop the spread of the disease (Brahmbhatt & Dutta, 2008, p. 2, 6; Ripoll & Wilkinson, 2018, p. 14). The WHO found that these restrictions have been costly and ineffective (Ripoll & Wilkinson, 2018, p. 14). During the Surat plague outbreak, the suspension of cargo shipments from India by the UAE and the embargoing of imports of foodstuffs, textiles or other goods from India, resulted in an estimated loss in exports of at least USD 420 million at 1994 prices (Brahmbhatt & Dutta, 2008, p. 6). During the 2014 West African Ebola crisis there was a decline in the availability of shipping for exports due to fears of contracting disease in the ports of the affected countries (UNDP, 2014, p. vii). The closure of land borders prevented vehicular traffic, with a strong impact on the economy and livelihoods (while not actually stopping other forms of traffic across the border) (Ripoll et al, 2018, p. 22). Women comprised of 70% of all cross-border traders, so were especially affected by the closure of borders and markets (AfDB, 2016, p. 23-24).

Health directives: quarantine, market closures, bans, culls and destruction of contaminated property

Some literature suggests that health-related directives during the 2014 West Africa Ebola crisis such as quarantining, do-not-touch policies and bans on bushmeat consumption, had significant impacts on people's abilities to sustain their livelihoods as they were prevented from working or lost their businesses (Lamoure & Juillard, 2020, p. 22; Ripoll et al, 2014, p. 18; Bonwitt et al, 2018, p. 171; Campbell et al, 2017, p. 12). Amara et al (2017, p. 2) found that Ebola 'containment measures depressed activity in all sectors of the economy'. Travel restrictions had a negative impact on the transport sector and made it harder to get to markets, while some markets were closed altogether (Amara et al, 2017, p. 23; Kodish et al, 2019, p. 8; Lamoure & Juillard, 2020, p. 22; Ripoll & Wilkinson, 2019, p. 21). There was a 20% reduction in the number of working traders during the Ebola outbreak in Sierra Leone (Kodish et al, 2019, p. 8). In the West Point quarter in Liberia, 'the lock-down on movement meant that people who sold smoked fish to other parts of the city could not do so, damaging livelihoods and food supplies' (Ripoll et al, 2018, p. 18). This also contributed to mistrust in the government and protests (Ripoll et al, 2018, p. 18).

Valuable assets were also lost when deceased people's belongings were sprayed with chlorine or burned as a result of health-related directives (Lamoure & Juillard, 2020, p. 22; Alcayna-

Stevens, 2018, p. 39). Fear also lead to some families destroying their possessions (Alcayna-Stevens, 2018, p. 39).

Certain industries can suffer due to the name given to major disease outbreaks. For example, H1N1, was initially misleadingly called 'swine flu', which cast a negative light on the pig industry (Ripoll & Wilkinson, 2019, p. 18). Blaming certain sources for major disease outbreaks, for example street vendors and cholera, can result in banning them and a subsequent loss in livelihoods, even though they are not necessarily the main issue (Ripoll & Wilkinson, 2018, p. 9). Banning bushmeat markets during the Ebola crisis also generated hostility to the response in general (Bonwitt et al, 2018; Ripoll et al, 2018, p. 3). Prevention measures such as culling of animals have also been met with resistance from farmers and traders (Ripoll & Wilkinson, 2019, p. 19).

Agriculture

Agriculture was hit hard by the West African Ebola crisis, especially as the onset of the outbreak coincided with the preparation of land, planting, and harvesting times (Amara et al, 2017, p. 22). In 2014 in Guinea, rice production is estimated to have fallen by 20%, coffee by half, cocoa by a third, and corn by a quarter (AfDB, 2016, p. 23). Quarantine measures meant that 'farmers could not properly tend their fields or buy and sell as normal in markets' (Amara, 2017, p. 2, 25). A paper by de la Fuente et al (2019, p. 3-4) found that in Liberia, which is a largely agrarian society, higher Ebola prevalence in districts led to greater disruption of group labour mobilisation for planting and harvest due to fear of contagion, thereby reducing rice area planted as well as rice yields (see also AfDB, 2016, p. 23; Gatiso et al, 2018, p. 10; Amara et al, 2017, p. 25). Nearly 54% of rural households in Liberia reported that their agricultural production had decreased during the Ebola crisis compared to before the previous year (Gatiso et al, 2018, p. 10). Women dominate the agricultural sectors in Guinea, Liberia and Sierra Leone so their livelihoods were especially affected by the impact of Ebola on agriculture (AfDB, 2016, p. 22). Vegetable traders who sold perishable goods lost much of their produce because of the ban on markets and travel restrictions (AfDB, 2016, p. 26).

The abrupt halt in manufacturing activities, such as those of the Sierra Leone Brewery Company, which used raw material primarily produced by female farmers, also had an impact on women's productivity (AfDB, 2016, p. 22).

Tourism

Major infectious disease outbreaks can negatively affect a country's tourism industry (Maphanga & Henama, 2019, p. 1; Brahmbhatt & Dutta, 2008, p. 6-7; UNDP, 2014, p. vii). As a result, countries have denied that they are undergoing cholera outbreaks, for example (see Ecuador in the 1990s or Zimbabwe in 2008) (Ripoll & Wilkinson, 2018, p. 4-5). During the Ebola outbreak in West Africa, the tourism industry was negatively affected by the 'cessation of flights to affected countries and tourism source countries issuing travel warnings to destinations affected by Ebola' (Maphanga & Henama, 2019, p. 1; AfDB, 2016, p. 26). There was a 50% drop in tourism in Sierra Leone from 2013 to 2014 (WEF, 2029, p. 4). The outbreak of Ebola in Sierra Leone led to the shut-down of hotels, airlines, guesthouses and restaurants, and to a drop in revenue and profits and increased unemployment rates across the country (Maphanga & Henama, 2019, p. 4-6). The decline in the airline and hospitality industries during the West Africa Ebola crisis particularly affected women, due to their greater involvement in these sectors (AfDB, 2016, p. 26). Maphanga & Henama (2019, p. 4-6) note that the effect on tourism went beyond the

disease-affected countries to other unaffected countries in Africa, which experienced lower travel consumption because of the existence of Ebola in other African countries.

Microfinance

During the Ebola crisis in West Africa there was a decline in banking hours and loan facilities, which affected people's abilities to access financial services or payoff loans (AfDB, 2016, p. 27). For example, BRAC which was the largest provider of micro-loans in Liberia, closed its operations in August 2014 (AfDB, 2016, p. 27). Community banks and rural financial services also closed completely or severely scaled down their operations (AfDB, 2016, p. 27).

The aid response

Other economic impacts of the response to major disease outbreaks include a rise in prices due to the arrival of large groups of aid workers which increases the cost of living for ordinary people (Alcayna-Stevens,2018, p. 38; Lamoure & Juillard, 2020, p. 22). On the other hand, the aid response can provide opportunities for people to find employment and piecemeal work (Alcayna-Stevens, 2018, p. 17). In the 2018 Ebola outbreak in Equateur Province, DRC, this resulted in relatively sudden imbalances in wealth between those working for the response and those not, which created a lot of resentment and bad feeling (Alcayna-Stevens, 2018, p. 38). Kapur (2020, p. 3) notes that in the ongoing Ebola outbreak in North Kivu, DRC, the 'influx of Ebola responders and associated cash flow may also inadvertently have created conditions which favourise economic or sexual exploitation and abuse'.

Based on her work in DRC, Alcayna-Stevens (2018, p. 17) also notes that 'as new employment opportunities for youth have led to greater financial emancipation from their elders, traditional leadership structures have been increasingly challenged, and inter-generational tensions may result in challenges for participatory decision-making (e.g. if elders reject the presence of foreigners whilst youth welcome them in the hope of employment opportunities)'.

Household impacts

The death, quarantine, or sickness of family members can also have an impact on household income, especially if they were the main wage earner (Lamoure & Juillard, 2020, p. 22; Alcayna-Stevens, 2018, p. 16, 39; Kodish et al, 2019, p. 12; Fischer et al, 2018, p. 10). The marginalisation of survivors of 2014 Ebola crisis also affects their ability to earn a living (Lamoure & Juillard, 2020, p. 22; Kodish et al, 2019, p. 8). The need to care for sick family members and increasing household expenditure on healthcare also has a serious impact of family incomes (Fisher et al, 2018, p. 10). 'Expenses related to transport, food and assistance may lead households and kinship groups, when these are responsible for a kinsman's expenses, into indebtedness' (Ripoll et al, 2018, p. 45).

The 2015 Population and Housing Census in Sierra Leone found that 55.5% of the economically active persons had a decrease in their revenues due to the Ebola outbreak, with 13.6% reporting substantial decreases in their revenues, which affected the livelihoods of household members and individuals (Amara et al, 2017, p.16, 21).

The economic impact of major infectious disease outbreaks and their response on poorer affected households is particularly high (Ripoll et al, 2018, p. 45). This loss of income can have short and long terms effects on access to basic needs (Fisher et al, 2018, p. 10).

Strategies to cope with the Ebola crisis in Sierra Leone included 'the sale of productive assets such as land, buildings, livestock and seed rice' which reduced future income opportunities (Amara et al, 2017, p. 24). The use of financial savings to cope increased vulnerability to future shocks, while reduced consumption of food was detrimental to physical well-being (Amara et al, 2017, p. 24). Research in Sierra Leone found that some young women engaged in more transactional sex during the Ebola crisis (Bandiera et al, 2018, p. 5).

Poverty

People living in poverty have limited means to cope with the shocks posed by major infectious disease outbreaks (de al Fuente et al, 2019, p. 2). de al Fuente et al (2019, p. 19) found that in Liberia 'per capita food consumption and, to a somewhat lesser extent, per capita total consumption fell by more between 2014 and 2016 in areas with higher [Ebola] prevalence, indicating that households did not have the means to completely self-insure against this (income) shock'. 'Rural poverty increased from 70% in the first half of 2014 (just before the Ebola crisis) to 82% in the first half of 2016 following the Ebola crisis' (de al Fuente et al, 2019, p. 19). Social protection schemes which may be a fundamental element in the livelihoods of the most vulnerable can also be interrupted as a result of shifting resources or lack of capacity (Amara et al, 2017, p. 7).

5. Health impacts

The direct health impacts of major disease outbreaks can be catastrophic and the 'indirect health impacts of pandemics can increase morbidity and mortality further' (Madhav et al, 2018, p. 323). Heath systems need time to return to normal (Ripoll et al, 2018, p. 46).

Health system

Major disease outbreaks can have a significant impact on health systems in affected countries, especially ones which are already fragile prior to the outbreak (Lamoure & Juillard, 2020, p. 23; Quaglio et al, 2019, p. 1). The diversion or depletion of funds, resources, and personnel used to provide routine care is one of the drivers of indirect health impacts (Madhav et al, 2018, p. 323; UNDP, 2014, p. 39). This redirection of funding includes donor funding, including for things like vaccination campaigns (UNDP, 2014, p. 38). The diversion of resources to respond to Ebola in places where the health system was already structurally poor, resulted in non-Ebola deaths as health centres were overwhelmed and lacked the capacity to treat regular health issues (e.g. diarrhoea, maternal health, HIV, tuberculosis vaccinations) (Lamoure & Juillard, 2020, p. 23; UNDP, 2014, p. vii).[1] The directives about not touching people also complicated the provision of healthcare (Lamoure & Juillard, 2020, p. 23). However, Amara et al (2017, p. 24) noted that the Ebola crisis in Sierra Leone led to improved hygiene across the country.

Decreased access to routine care as a result of an inability to travel, fear stopping people from going to healthcare facilities for routine healthcare, or other factors, is another driver of the indirect health impacts of major infectious disease outbreaks (Madhav et al, 2018, p. 323;

[1] Diversion of human resources in the health sector can extend beyond the affected country. For example, MSF diverted hundreds of staff from other MSF emergency projects worldwide during the first year of the West Africa Ebola outbreak (MSF, 2015, p. 4).

Quaglio et al, 2019, p. 1; Kapur, 2020, p. 3; Amara et al, 2017, p. 24). The health care system can also be burdened by fear leading to an upsurge of the "worried well" seeking unnecessary care (Madhav et al, 2018, p. 323).

Trust in the national health system in Sierra Leone declined, leading to an overall reduction in the use of health services (Quaglio et al, 2019, p. 1). The Ebola outbreak in Liberia also exposed the 'wide mistrust of health workers and of health advice provided by public sources and NGOs', as a result of 'a culture that presumes gain and exploitation of other people's problems to make money' (Santos & Novelli, 2017, p. 11). Lack of trust of medical practitioners was also found in Guinea (Calnan et al, 2018, p. 407).

A study in Guinea of 45 public facilities during the 2014 Ebola outbreak found that there was a 31% decrease in outpatient visits for routine maternal and child health services (Madhav et al, 2018, p. 323). Hospitals saw a 60% decrease in visits for diarrhoea and a 58% decrease in visits for acute respiratory illness amongst children under five (Madhav et al, 2018, p. 323). Heath centres on the other hand saw a 25% decrease in visits for diarrhoea and a 25% decrease in visits for acute respiratory illness (Madhav et al, 2018, p. 323). During the outbreak in Sierra Leone, visits to public facilities for reproductive health fell by up to 40% (Madhav et al, 2018, p. 323). Infection control measures in Liberia meant that the total number of hospital beds decreased, and pregnant women were turned away from 'full facilities' (Ripoll et al, 2018, p. 18).

'Lack of routine care for malaria, HIV/AIDS, and tuberculosis led to an estimated 10,600 additional deaths in Guinea, Liberia, and Sierra Leone' during the 2014 Ebola crisis (Madhav et al, 2018, p. 323). There was also a 30% decrease in routine childhood vaccinations (Madhav et al, 2018, p. 323). During the 2009 H1N1 influenza pandemic, 'a greater surge in hospital admissions for influenza and pneumonia was associated with statistically significant increases in deaths attributable to acute myocardial infarction and stroke' (Madhav et al, 2018, p. 323). However, it should be noted that it is difficult to distinguish which deaths are attributable to a pandemic, and which may be merely coincidental (Madhav et al, 2018, p. 323).

People who were especially affected by the impact of 2014 Ebola crisis on health systems included people with chronic and acute diseases, including infectious diseases, such as HIV and malaria, pregnant women, or people with more benign sicknesses (Lamoure & Juillard, 2020, p. 23).

Healthcare workers

The availability of healthcare workers and their ability to provide care decreases during major infectious disease outbreaks as a result of illness, deaths, and fear-driven absenteeism (Madhav et al, 2018, p. 323; Ripoll & Wilkinson, 2019, p. 24; Quaglio et al, 2019, p. 1). Healthcare workers were lost from the system during the 2014 Ebola crisis, which contributed to understaffing or closure of healthcare facilities, and has affected the health system long after the crisis has ended (Madhav et al, 2018, p. 323; Evans et al, 2015). Healthcare workers experienced high mortality rates (8% of doctors, nurses, and midwives died in Liberia, 7% in Sierra Leone, and 1% in Guinea) (Madhav et al, 2018, p. 324; Evans et al, 2015, p. 2). The risk Ebola posed to health workers also meant that some 'became afraid and left their posts or refused to take in patients with a fever or any other Ebola-like symptoms' (Lamoure & Juillard, 2020, p. 23). During a severe influenza pandemic, up to 40% of healthcare workers 'might be unable to report for duty because they are ill themselves, need to care for ill family members, need to care for children because of school closures, or are afraid' (Madhav et al, 2018, p. 324).

During the 2018 Ebola outbreak in DRC, free healthcare was provided (Alcayna-Stevens, 2018, p. 34-35). This 'put the whole rural health system under strain' (Alcayna-Stevens, 2018, p. 35). Many rural nurses did not receive a regular state salary, or any salary at all and made their 'living by charging for consultations, or by making a small profit on the sale of medicines' (Alcayna-Stevens, 2018, p. 35). Although they were supposed to receive compensation for the lost income, many of the nurses interviewed by Alcayna-Stevens (2018, p. 35) were struggling to support themselves and afford their children's school fees. This contributed to community members' mocking and stigmatising them (Alcayna-Stevens, 2018, p. 35).

Maternal and child health

Some studies show that maternal and child health was negatively affected by the Ebola crisis (Delamou et al, 2017, p. e448; Quaglio et al, 2019, p. 6; AfDB, 2016, p. 11, 22, 27; Amara et al, 2017, p. 5). Delamou et al's (2017, p. e448) study in Guinea found that 'most maternal and child health indicators significantly declined' during the Ebola outbreak in 2014 and post-crisis levels had not recovered to their pre-outbreak levels. Estimates suggest that 30% of healthcare workers who died during the West Africa Ebola outbreak were maternal and child health care providers (Quaglio et al, 2019, p. 2; AfDB, 2016, p. 28). Services were also affected by the closure of not-for-profit hospitals (Quaglio et al, 2019, p. 7). Fear also prevented women and children from attending healthcare facilities (Amara et al, 2017, p. 5). Reduction in health service uptake differed across the different districts in Sierra Leone (Quaglio et al, 2019, p. 2). 'Districts such as Kambia, Port Loko and Bonthe showed large reductions in facility-based delivery (between 38% and 41%)', whereas Pujehun showed only a 5% decrease (Quaglio et al, 2019, p. 2). Research in Pujehun district in Sierra Leone by Quaglio et al (2019) found that the district's stronger health system and strengthened referral system, as well as being less affected by Ebola, meant that it was better able to maintain maternal and child heath services during and after the Ebola epidemic. After a dip in maternal and child health indicators and service uptake immediately after the onset of the outbreak, there was a levelling or increase during the Ebola and post-Ebola period (Quaglio et al, 2019, p. 6). This contrasts with other studies that showed a decline in maternal and child health services in the Ebola and post-Ebola periods (Delamou et al, 2017, p. e448; Quaglio et al, 2019, p. 6; AfDB, 2016, p. 27).

Different studies in Guinea suggested that maternal health care in the post-Ebola period was not showing signs of recovery (Delamou et al, 2017, p. e448; Quaglio et al, 2019, p. 7). In Liberia, on the other hand, there were significant positive trends for ante-natal care and institutional deliveries post-Ebola (Quaglio et al, 2019, p. 7).

Mental health

The chaos, fear and losses suffered during major disease outbreaks can result in increased mental health problems, including anxiety, depression and post-traumatic stress disorder (Lamoure & Juillard, 2020, p. 24; Santos & Novelli, 2017, p. 9; AfDB, 2016, p. 29; ACAPS, 2015, p. 7; Jalloh et al, 2018, p. 8). These mental health symptoms can persist years after the epidemic has ended (Jalloh et al, 2018, p. 8-9). Both survivors and those who have lost relatives may suffer as they have been through traumatic experiences and may face stigma (Lamoure & Juillard, 2020, p. 24; AfDB, 2016, p. 29). Control measures, such as isolation and quarantine, can lead to increased depression and anxiety (Fisher et al, 2018, p. 13-14; Campbell, 2017, p. 6; Jalloh et al, 2018, p. 8-9).

In the case of Ebola, activities that were 'deeply social and psychologically meaningful, such as caring for the sick, or washing the corpses of loved ones before burial' were discouraged because they were most likely to transmit Ebola, which created elevated levels of distress and disorder (Ripoll et al, 2018, p. 19, 39; AfDB, 2016, p. 29-30). In addition, the change in burial practices needed to ensure safe burials, was distressing and 'can have a continuing and devastating impact on the everyday life and long-term mental health of affected communities' (Alcayna-Stevens, 2018, p. 34; Ripoll et al, 2018, p. 39). Mental health issues also arose as a result of the trauma of the disease, the trauma of losing family members, and the social stigmatisation experienced by many survivors (Alcayna-Stevens, 2018, p. 41; Calnan et al, 2018, p. 405-406). Formal and informal support for mental health was lacking (Calnan et al, 2018, p. 405).

Nutrition

Responses to major infectious disease outbreaks can disrupt livelihoods and food supplies, affecting people's ability to feed themselves. Movement restrictions and the 21-day quarantine In Sierra Leone contributed to disruptions across the food value chain, on par with that typically resulting from large natural disasters, that affected individual-,household-, and population-level nutritional status (Kodish et al, 2019, p. 1, 6; Campbell et al, 2017, p. 11; UNDG WCA, 2015, p. iv).

Little food production went on due to people not being able to go to their farms, not being able to harvest their farms, not being able to process food, and not being able to go to market (Kodish et al, 2019, p. 6). The closure of markets during the 2014 Ebola crisis in Liberia, meant that people did not know where to get their food from (Ripoll et al, 2018, p. 22). The lockdown meant that food became expensive and hard to get (Kodish et al, 2019, p. 7, 9; AfDB, 2016, p. 23). As the outbreak coincided with the planting season, there were great losses in harvests due to reduced manpower as people who were usually involved were too sick or quarantined (Kodish et al, 2019, p. 8). As agricultural activities were largely communal in nature, the quarantine was particularly difficult in rural areas (Kodish et al, 2019, p. 8). The quarantine also meant that the primary coping strategy in times of food shortages, inter-household food sharing, was not possible (Kodish et al, 2019, p. 8). In addition, organisations often shifted their focus from nutrition activities to response to the Ebola outbreak (Kodish et al, 2019, p. 10).

The scarcity of food meant that children and adults were eating fewer meals a day (Kodish et al, 2019, p. 11; AfDB, 2016, p. 23). Kodish et al's (2019, p. 15) study of nutrition in Sierra Leone, found that 'nutritional challenges were disproportionately felt by infants and young children–an already nutritionally vulnerable group'.

Research into the 2018 Ebola crisis in DRC found that nurses had noticed an 'alarming rise in the number of malnourished children' (Alcayna-Stevens, 2018, p. 38). This was attributed to neglect of their fields by those working on the response; lack of labour power amongst some families to work in the fields due to deaths or post-Ebola syndrome; self-isolation or fear keeping people away from their fields; higher wages of agricultural workers due to the effects of the response on the local economy; fear and stigma preventing people from selling their produce in other villages and traders no longer coming to them; and fear around bushmeat meaning that children no longer received an important source of protein (Alcayna-Stevens, 2018, p. 38-39; AfBD, 2016, p. 26).

Waste

Depending on the nature of the disease, large amounts of waste may be generated by the response (Campbell et al, 2017, p. 12). For example, during Ebola outbreaks, any clothing, bedding and other materials that comes in contact with infected people has to be disposed of (Campbell et al, 2017, p. 12). Quarantines can also generate a lot of waste as households may be unable to access their usual waste disposal methods (Campbell et al, 2017, p. 12). This can have health and sanitation implications.

6. Political and security impacts

Political instability

Major infectious disease outbreaks can increase political stresses and tensions, especially in countries with weak institutions and legacies of political instability (Menzel, 2017, p. 12, 17, 44; Madhav et al, 2018, p. 316, 325; Alcayna-Stevens, 2018, p. 18; Ripoll & Wilkinson, 2018, p. 11; Ripoll et al, 2018, p. 8, 10). Historical research has looked at the effects of infectious diseases on societies and found they played a role in the 'expansion and collapse of various societies' (Menzel, 2017, p. 16-17; see also Gonzalez-Torres & Esposito, 2017, p. 7-8). Research focusing on more contemporary outbreaks has argued that 'high disease prevalence can increase the risk of violence and instability by undermining traditional coping mechanisms of households, impairing economic productivity, increasing the risk of food shortages, and leading to population age structures with large youth cohorts, all of which reinforce a country's propensity to turmoil', although 'the empirical link between infectious diseases, state capacity, and violence is less clear than often claimed' (Patrick, 2011 in Menzel, 2017, p. 17). Failure to protect its citizens against infectious disease outbreaks can undermine the state-citizen contract and undermine the state's legitimacy (Menzel, 2017, p. 18).

Some disease seems to have less effect on political stability than others, especially those which are chronically prevalent rather than short-term and acute, even if they generally result in greater morbidity, mortality, and long-term socio-economic erosion (tuberculous in comparison to types of influenza, for example) (Menzel, 2017, p. 11, 44-45). More virulent sub-types of influenza are seen to be especially detrimental to political stability, in comparison to other types of infectious diseases (Menzel, 2017, p. 45-46, 57). The 'greater the risk that a large proportion of the population falls ill and pre-maturely dies, the stronger the expected destabilising effect of the disease as the population's perceived (and real) risk increases' (Menzel, 2017, p. 44). In addition, 'diseases that are lacking clear scientific or medical knowledge and effective treatment options are also more prone to having a significant negative effect on political stability because the resulting sense of uncertainty and helplessness may act as destabilising' (Menzel, 2017, p. 44). Lack of clear, accurate communication can play a role in fuelling panic and fear (Menzel, 2017, p. 44). 'Perceptions that containment efforts undertaken by authorities are unsuccessful may further contribute to destabilisation' (Menzel, 2017, p. 45).

Violent reactions to outbreak responses

Outbreak responses, such as quarantines, can result in violence and tensions between states and citizens, especially if the response strategies are coercive or authoritarian, and there are 'weak institutional settings, with low trust, weak public health systems and state coercion that is perceived as illegitimate' (Madhav et al, 2018, p. 316; Ripoll et al, 2018, p. 24; Gonzalez-Torres

& Esposito, 2017, p. 29, 47). During the 2014 Ebola crisis for example, responses to the outbreak such as quarantines and curfews were viewed with suspicion by segments of the public and opposition political leaders, which led to riots and violent clashes with security forces, as well as attacks on healthcare facilities and workers (Madhav et al, 2018, p. 325; Campbell et al, 2017, p. 8-9; Menzel, 2017, p. 12; Gonzalez-Torres & Esposito, 2017, p. 2). Gonzalez-Torres & Esposito (2017, p. 5, 25-26, 47) found that instances of Ebola increased the likelihood of localised subversive violence (attacks on institutional and medical authorities) in the next couple of weeks, especially in areas where trust was already low. The imposition of safe burial practises contributed to civil violence (Gonzalez-Torres & Esposito, 2017, p. 47). 'Military district quarantines have a large impact on increasing the likelihood of riots and protests, beyond the impact of new infections' (Gonzalez-Torres & Esposito, 2017, p. 5, 31). Civil violence was more likely in the early stages of the outbreak (Gonzalez-Torres & Esposito, 2017, p. 27, 31).

Politicisation of the situation

The situation can also be politicised or used for political gain (Ripoll et al, 2018, p. 10-11, 29). The 2014 Ebola crisis also 'amplified political tensions in Guinea, Liberia, and Sierra Leone, with incumbent politicians accused of leveraging the crisis and disease control measures to cement political control and opposition figures accused of hampering disease response efforts' (Madhav et al, 2018, p. 325; see also Alcayna-Stevens, 2018, p. 18 in the 2018 DRC Ebola outbreak). These tensions did not lead to large-scale violence or instability but did complicate the public health response (Madhav et al, 2018, p. 325; Menzel, 2017, p. 47). In Liberia, latent political tensions among previously warring factions 'reemerged early in the epidemic and were linked with threats to health care workers as well as attacks on public health personnel and facilities' (Madhav et al 2018, p. 325). In Sierra Leone, 'quarantine in opposition dominated regions was delayed because of concerns that it would be seen as politically motivated' (Madhav et al, 2018, p. 325). Healthcare workers and other responders working on the Ebola crisis in North Kivu, DRC, have been received with suspicion and violence as Ebola is viewed as the latest 'weapon of war' in the ongoing civil war in the area (Ripoll et al, 2018, p. 11, 29).

Decrease in trust

Major disease outbreaks can also result in decreased trust in institutions (Gonzalez-Torres & Esposito, 2017, p. 5). The reaction to the Ebola crisis, for instance, also 'negatively affected Liberians' perceptions of their own government and public workers', and trust in Liberian institutions declined (Santos & Novelli, 2017, p. 9; Gatiso et al, 2018, p. 12-13). Gonzalez-Torres & Esposito (2017, p. 5, 39) found that 'two years after the outbreak there are lower levels of trust across measures compared to pre-epidemic levels', especially in areas that were hardest hit and amongst strong religious communities as behavioural adaptions impact on their cultural practices. Areas with lower levels of trust in leaders had higher rates of civil violence as a result of the epidemic (Gonzalez-Torres & Esposito, 2017, p. 36).

Political stability

However, despite the governments' unpreparedness, the uncoordinated response, and the poor state of public healthcare systems playing a vital role in the outbreak in West Africa, 'politicians and national governments did not face political consequences as much of the blame was placed on the WHO and the international response' (Menzel, 2017, p. 47). In contrast to expectations that Ebola would have a significant destabilising effect, Menzel's (2017, p. 46, 59) quantitative

data analysis even suggested that Ebola resulted positive effect on political stability, although she acknowledges that there may be flaws in the data or the statistical model. Some potential explanations for this positive correlation include that the crisis provided governments with the opportunity to prove themselves capable and strengthen confidence in them, that people united around the common threat of Ebola, or that international aid helped stabilise the situation (Menzel, 2017, p. 48).

Security forces and armed groups

There is also a risk that major disease outbreaks will have an impact on countries' ability to manage instability by affecting their security forces (Madhav et al, 2018, p. 325). A weakened security force can also 'amplify the risk of civil war and other forms of violent conflict' (Madhav et al, 2018, p. 325).

In addition, when outbreaks occur in conflict affected places such as North Kivu, the 'health-seeking practices of armed groups can increase insecurity and heighten the risk of transmission' (Ripoll et al, 2018, p. 34).

7. References

ACAPS. (2015). *Ebola outbreak in West Africa - Challenges to the reintegration of affected groups into communities*. ACAPS. https://www.acaps.org/sites/acaps/files/products/files/p_challenges_to_the_reintegration_of_affected_groups_into_communitie_nov_11_2015.pdf

African Development Bank (AfDB). (2016). *Women's Resilience: Integrating Gender in the Response to Ebola*. African Development Bank. https://reliefweb.int/sites/reliefweb.int/files/resources/AfDB_Women_s_Resilience_-_Integrating_Gender_in_the_Response_to_Ebola.pdf

Agencies. (2014). US Peace Corps evacuates hundreds from west Africa over Ebola outbreak. *The Guardian*, 13.7.14. https://www.theguardian.com/world/2014/jul/31/us-peace-corps-evacuation-ebola-west-africa

Alcayna-Stevens, L. (2018). *Planning For Post-Ebola - Lessons Learned From DR Congo's 9th Epidemic*. UNICEF. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14450

Amara, M.M., Tommy, F., & Kamara, A.H. (2017). *Sierra Leone 2015 Population and Housing Census - Thematic Report on socio-economic impact of the Ebola Virus Disease*. Statistics Sierra Leone. https://sierraleone.unfpa.org/sites/default/files/pub-pdf/EVD%20report.pdf

Bandiera, O., Buehren, N., Goldstein, M., Rasul, I., & Smurra, A. (2018). *The Economic Lives of Young Women in the Time of Ebola: Lessons from an Empowerment Program*. Africa Gender Innovation Lab. https://www.povertyactionlab.org/sites/default/files/publications/The-Economic-Lives-of-Young-Women_ELA_SL_Bandiera-et-al_Dec2018.pdf

Brahmbhatt, M., & Dutta, A. (2008). *On SARS Type Economic Effects during Infectious Disease Outbreaks* (Policy Research Working Paper 4466). The World Bank. http://documents.worldbank.org/curated/en/101511468028867410/pdf/wps4466.pdf

Bonwitt, J., Dawson, M., Kandeh, M., Ansumana, R., Sahr, F., Brown, H., & Kelly, A.H. (2018). Unintended consequences of the 'bushmeat ban' in West Africa during the 2013–2016 Ebola virus disease epidemic. *Social Science & Medicine*, 200, 166-173. https://doi.org/10.1016/j.socscimed.2017.12.028

Calnan, M., Gadsby, E.W., Kondé, M.K., Diallo, A., & Rossman, J.S. (2018). The Response to and Impact of the Ebola Epidemic: Towards an Agenda for Interdisciplinary Research. *International Journal of Health Policy and Management*, 7:5, 402-411. https://doi.org/10.15171/ijhpm.2017.104

Campbell, L., Adan, C., & Morgado, M. (2017). *Learning from the Ebola Response in cities - Responding in the context of quarantine*. ALNAP. https://www.alnap.org/help-library/learning-from-the-ebola-response-in-cities-responding-in-the-context-of-urban

Campbell, V.A., Gilyard, J.A., Sinclair, L., Sternberg, T., & Kailes, J.I. (2009). Preparing for and Responding to Pandemic Influenza: Implications for People With Disabilities. *American Journal of Public Health*, 99:2, s294-s300. https://doi.org/10.2105/AJPH.2009.162677

de al Fuente, A., Jacoby, H.G., Lawin, K.G. (2019). *Impact of the West African Ebola Epidemic on Agricultural Production and Rural Welfare - Evidence from Liberia* (Policy Research Working

Paper 8880). World Bank Group. http://documents.worldbank.org/curated/en/423511560254844269/pdf/Impact-of-the-West-African-Ebola-Epidemic-on-Agricultural-Production-and-Rural-Welfare-Evidence-from-Liberia.pdf

Delamou, A., El Ayadi, A.M., Sidibe, S., Delvaux, T., Camara, B.S., Sandouno, S.D., Beavogui, A.H., Rutherford, G.W., Okumura, J., Zhang, W-H., & De Brouwere, V. (2017). Effect of Ebola virus disease on maternal and child health services in Guinea: a retrospective observational cohort study. *Lancet Global Health*, 5, e448-e457. http://dx.doi.org/10.1016/S2214-109X(17)30078-5

Evans, D.K., Goldstein, M., & Popova, A. (2015). *The Next Wave of Deaths from Ebola? The Impact of Health Care Worker Mortality* (Policy Research Working Paper 7344). The World Bank. http://documents.worldbank.org/curated/en/408701468189853698/pdf/WPS7344.pdf

Fan, V.Y., Jamison, D.T., & Summers, L.H. (2018). The Loss from Pandemic Influenza Risk. In D.T. Jamison, H. Gelband, S. Horton, P. Jha, R. Laxminarayan, C.N. Mock, & R. Nugent. *Disease Control Priorities: Improving Health and Reducing Poverty* – 3rd edition. World Bank. https://www.ncbi.nlm.nih.gov/books/NBK525291/

Fisher, H-T., Elliot, L., & Bertrand, S.L. (2018). *Guidance Note: Protection of Children during Infectious Disease Outbreaks*. The Alliance for Child Protection in Humanitarian Action. https://resourcecentre.savethechildren.net/node/13328/pdf/protection_of_children_during_infectious_disease_outbreak_guidance_note.pdf

Gatiso, T.T., Ordaz-Nèmeth, I., Grimes, T., Lormie, M., Tweh, C., Kühl, H.S., & Junker, J. (2018). The impact of the Ebola virus disease (EVD) epidemic on agricultural production and livelihoods in Liberia. *PLoS Neglected Tropical Diseases*, 12:8: e0006580, 1-17. https://doi.org/10.1371/journal.pntd.0006580

Gonzalez-Torres, A., & Esposito, E. (2017). *Epidemics and Conflict: Evidence from the Ebola outbreak in Western Africa*. European University Institute. https://econ.tau.ac.il/sites/economy.tau.ac.il/files/media_server/Economics/PDF/seminars%202017-18/adagt_jmp_conflict.pdf

Jalloh, M.F., Li, W., Bunnell, R.E., et al. (2018), Impact of Ebola experiences and risk perceptions on mental health in Sierra Leone, July 2015. *BMJ Global Health*, 3:e000471, 1-11. https://doi.org/10.1136/bmjgh-2017-000471

Kapur, N. (2020). *Gender Analysis: Prevention and Response to Ebola Virus Disease in the Democratic Republic of Congo*. Care.

Kodish, S.R., Bio, F., Oemcke, R., Conteh, J., Beauliere, J.M., Pyne-Bailey, S., *et al*. (2019) A qualitative study to understand how Ebola Virus Disease affected nutrition in Sierra Leone—A food value-chain framework for improving future response strategies. *PLoS Neglected Tropical Diseases*,13:9: e0007645, 1-19. https://doi.org/10.1371/journal.pntd.0007645

Lamoure, G., & Juillard, H. (2020). *Ebola and Cholera Epidemics - An ALNAP Lessons Paper*. ALNAP. https://www.alnap.org/help-library/ebola-and-cholera-epidemics-an-alnap-lessons-paper

Madhav, N., Oppenheim, B., Gallivan, M., Nulembakani, P., Rubin, E., & Wolfe, N. (2018). Pandemics: Risks, Impacts, and Mitigation. In D.T. Jamison, H. Gelband, S. Horton, P. Jha, R. Laxminarayan, C.N. Mock, & R. Nugent. *Disease Control Priorities: Improving Health and*

Reducing Poverty – 3rd edition. World Bank. http://dcp-3.org/sites/default/files/chapters/DCP3%20Volume%209_Ch%2017.pdf

Maphanga, P.M., & Henama, U.S. (2019). The Tourism Impact of Ebola in Africa: Lessons on Crisis Management. *African Journal of Hospitality, Tourism and Leisure*, 8:3, 1-13. https://www.researchgate.net/publication/333745290_The_Tourism_Impact_of_Ebola_in_Africa_Lessons_on_Crisis_Management

Medecins Sans Frontieres (MSF). (2015). *Pushed to the Limit and Beyond – A year into the largest ever Ebola outbreak*. MSF. https://www.msf.org.uk/sites/uk/files/ebola_-_pushed_to_the_limit_and_beyond.pdf

Menzel, C. (2017). *The impact of outbreaks of infectious diseases on political stability: examining the examples of Ebola, tuberculosis and influenza*. Young Perspectives. Konrad Adenauer Stiftung & KACIRSS. https://www.kas.de/documents/252038/253252/7_dokument_dok_pdf_52294_1.pdf/95dc732e-2eda-2698-b01f-7ac77d060499?version=1.0&t=1539647543906

Quaglio, G., Tognon, F., Finos, L., *et al*. (2019). Impact of Ebola outbreak on reproductive health services in a rural district of Sierra Leone: a prospective observational study. *BMJ Open*, 9: e029093, 1-9. https://bmjopen.bmj.com/content/9/9/e029093

Reilly, L., & Llorente, R.V. (2015). Organisational risk management in high-risk programmes: the non-medical response to the Ebola outbreak. *Humanitarian Exchange*, 64, 26-28. https://odihpn.org/magazine/organisational-risk-management-in-high-risk-programmes-the-non-medical-response-to-the-ebola-outbreak/

Ripoll, S., & Wilkinson, A. (2019). *Social Science in Epidemics: Influenza and SARS lessons learned*. Social Science in Humanitarian Action. https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/14326/SSHAP_Social_Science_Lessons_Learned_Influenza_and_SARS_Full_report.pdf?sequence=1&isAllowed=y

Ripoll, S., & Wilkinson, A. (2018). *Social Science in Epidemics: Cholera lessons learned*. Social Science in Humanitarian Action. https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/14200/Final_Cholera_Social_Science_Lessons_Learned_full%20report_pdf.pdf?sequence=1&isAllowed=y

Ripoll, S., Gercama, I., Jones, T., & Wilkinson, A. (2018). *Social Science in Epidemics: Ebola Virus Disease lessons learned*. Social Science in Humanitarian Action. https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/14160/Final_Ebola_lessons_learned_full_report.pdf?sequence=204&isAllowed=y

Rohwerder, B. (2014). *Impact and implications of the Ebola crisis* (GSDRC Helpdesk Research Report 1177). Birmingham, UK: GSDRC, University of Birmingham. https://assets.publishing.service.gov.uk/media/57a089a540f0b649740001cc/hdq1177.pdf

Santos, R., & Novelli, M. (2017). *The Effect of the Ebola Crisis on the Education System's Contribution to Post-Conflict Sustainable Peacebuilding in Liberia*. Centre for International Education, University of Sussex. https://educationanddevelopment.files.wordpress.com/2016/06/liberia-report_march2017_lowres.pdf

United Nations Development Group Western and Central Africa (UNDG WCA). (2015). *Socio-Economic Impact of Ebola Virus Disease in West African Countries - A call for national and regional containment, recovery and prevention*. UNDG WCA. https://www.undp.org/content/dam/rba/docs/Reports/ebola-west-africa.pdf

UNDP. (2014). *Assessing the socio-economic impacts of Ebola Virus Disease in Guinea, Liberia and Sierra Leone - The Road to Recovery*. UNDP. https://www.undp.org/content/dam/rba/docs/Reports/EVD%20Synthesis%20Report%2023Dec2014.pdf

World Economic Forum (WEF). (2019). *The Global Risks Report 2019* - 14th Edition. World Economic Forum. http://www3.weforum.org/docs/WEF_Global_Risks_Report_2019.pdf

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