

PUBLIC HEALTH IN THE CALAIS REFUGEE CAMP: ENVIRONMENT, HEALTH, AND EXCLUSION

ABSTRACT

The on-going emergency for refugees is having profound and hidden health consequences for thousands of displaced persons who live in informal 'makeshift' camps across Europe. This interdisciplinary paper reports the results of the first environmental health assessment in such a location, in what was Europe's largest informal refugee camp in 2016, in Calais, northern France. We detail the lack of facilities for sanitation, safe provision of food, water, and shelter, demonstrating how conditions fall short of agreed standards for formal refugee camps. Rather than the notion of migrants being the cause of health problems, this paper critically reveals the hidden materiality of bodily injury caused by poor health conditions, where the camp itself produces harm. Drawing upon theories of biopolitical exclusion, the paper concludes by (i) emphasising the empirical and conceptual themes that tie refugee politics and biologies together, and (ii) makes a call for increased attention to makeshift camps as key sites of health exclusion in Europe and beyond.

KEYWORDS

Public health, refugee camps, environmental health, migration, exclusion

1. INTRODUCTION

The public health implications of abandoning forced-migrants to live in makeshift camps is critically under-researched. The ongoing global emergency for refugees is having devastating implications, with an estimated 60 million people worldwide currently displaced (UNHCR 2015). While the majority (86%) of these vulnerable people are hosted in developing countries such as Lebanon, Turkey and Pakistan (UNHCR 2015), between 2015 and 2016, over a million refugees entered Europe to seek asylum. The arrival of asylum seekers in large numbers coupled with inadequate state provision, has created significant concerns for the health and wellbeing of migrants (Kupferschmid 2016). Makeshift camps, which do not meet minimum humanitarian standards, have increasingly become accepted as 'de facto' living spaces for refugees in parts of Europe (Davies and Isakjee 2015).

This paper focusses on Calais in northern France, in what was Europe's largest informal refugee camp with a population of 10,000, before its demolition in November 2016. The paper details the results of the first holistic environmental health survey in such a setting empirically examines public health conditions to which residents of the camp were exposed. By applying an environmental-health focus and by comparing the conditions with recognised minimum standards, the paper reveals the hidden materiality of bodily injury caused by the poor health conditions. Applying theories of biopolitical exclusion (Foucault 1998, Fassin 2001), we conceptualise the findings as the physical manifestation of new exclusions in public health. We conclude by emphasising the importance of critically and holistically researching situations in which health, environment and exclusion intertwine, particularly in informal residential settings.

2. THE INFORMAL CAMP IN CALAIS

Informal migrant camps in Calais have existed in some form since at least the late 1990s. When the '*Sangatte Refugee Center*' near Calais closed its doors in 2002, displaced migrants were once more abandoned to the streets of the port town in northern France to live without state assistance (for a comprehensive description see Reinisch 2015). Many resided in scattered makeshift encampments nicknamed 'jungles' (Millner 2011; Davies et al 2017), dispersed across the Pas-de-Calais region as they attempted to reach the UK, or awaited official asylum protection in France. In April 2015, with the escalation of the global refugee emergency putting pressure on the EU's migration bottlenecks, French police forcibly demolished these smaller scattered 'jungles' and prevented refugees from living anywhere other than the 'new Jungle', which is the site of this study. Situated on Calais' eastern outskirts near an industrial site and Seveso Zone of moderate toxic risk, this area of sand dunes and dense shrubbery was approximately half a kilometre in area and housed 3000 people at the time of the data-collection in July 2015. Survey data available indicated that 96.8% of residents were male (RRDP 2016).

Whilst the British and French governments committed significant resources to securitize the camp with fences and the employment of bulldozers and tear gas (Joint Ministerial Declaration 2015), humanitarian relief and health-focussed efforts became relegated and under-provisioned. To fill the void left by official humanitarian support, major NGOs including Doctors of the World (DOTW), as well as other grassroots groups, have provided emergency first-aid, food handouts and some basic sanitation facilities. This voluntary emergency response to refugee health-needs has been echoed across France and throughout Europe's archipelago of informal camps. Underneath these contested layers of politics and charity however, unsuitable public health

conditions continued to harm migrant bodies and minds in often unseen ways, which this paper seeks to uncover.



Figure 1: A view across part of the Calais camp showing the predominant type of improvised shelter.

3. BIOPOLITICS AND NEW HEALTH EXCLUSIONS

The parallel advancement and development of both nation-states and governance on the one hand, and technologies of medicine on the other, have transformed the way in which we conceptualise health and exclusion (see Foucault 1978, Fassin 2001, Redfield 2005, Sparke 2006). In more economically advanced countries such as those in Western Europe, medical advancements and modern state development combines to offer citizenry guarantees of care. These are not only statutory provisions of *healthcare*, but also include legal and governmental actions on health, environment and poverty which actively seek to limit the potential of inhabitants succumbing to illness and accident pre-emptively. Foucault describes this power as one which,

“exerts a positive influence on life, that endeavours to administer, optimise, and multiply it, subjecting it to precise controls and comprehensive regulations.” (Foucault 1978: 137)

With these advancements, the boundaries that draw out exclusionary practices in relation to health are also prone to shift. Health exclusions are operationalised in new ways, where the withdrawal of healthcare or the lack of regulation and resource to ensure safe living and working conditions, in themselves constitute a form of exclusion. In such exclusions, environmental conditions can play a key role and this realisation has provided fertile ground for authors on environmental injustice (Bullard 1990) and health and social inequalities (Marmot 2010). Moreover as Walker (2009) argues, such injustices and inequalities go beyond concrete spatialities and

proximities, but instead involve a variety of flows and spatial relations which combine to produce vulnerabilities. In this empirical study it is the identity and the immobility of the unwelcome refugee population of Calais that makes them particularly vulnerable. As outcast 'others', migrants and refugees can be denied access to provisions and protections, that normalised populations can depend upon (Fassin 2001; Grove & Zwi 2006).

With reference to refugees specifically, Bauman (2004) discusses how such processes of exclusion permit certain groups to be outcast and treated as superfluous, dehumanised and socially abject, to the point of becoming 'wasted life'. Anti-migration rhetoric has often relied upon framing refugees as a threat to public health, with fears espoused that migrants may be carrying disease, plagues and spreading infections as they move from economic hinterlands into advanced, developed states (Muller 2004; Harper & Ramen 2008; Smith 2016). While some commentators have described the potential for 'forgotten pathogens' re-emerging in Europe due to increased refugees numbers (Cutler 2016: 9), we agree with others who suggest that the risk of such infections spreading to local populations are extremely low, with 'the bigger challenge [being] how to ensure that refugees don't get sick after their arrival' (Kupferschmidt 2016: 392).

Bringing together this theorisation of migrant 'others' and illness with political exclusions, Fassin (2001) goes into specific detail in relation to these dynamics in a contemporary French context. Fassin explores both the denial of healthcare to undocumented migrants and the use of illness to legitimize residency claims for asylum seekers, to conceptualise a racialized migrant body, for whom politics and embodied suffering are intrinsically intertwined (ibid: 3). This study adds another dynamic to this set of biopolitics, by foregrounding the embodied effects of political strategies of exclusion in Calais.

4. HEALTH IN REFUGEE CAMPS

One way of avoiding the aforementioned exclusion of irregular migrant populations is by providing and enforcing a set of global minimum standards to ensure that refugees are treated in a just manner. The Sphere Project for example provides standards for the structure and administration of refugee camps covering the key issues of water supply, food security and nutrition, sanitation, hygiene promotion, shelter and settlement. The standards contain overriding principles including an unpinning requirement of any interventions, that '[t]he form of humanitarian assistance and the environment in which it is provided do not *further expose people* to physical hazards, violence or other rights abuse' (Sphere Project 2016, emphasis added). The UNHCR (2007) also provides extensive and detailed standards for shelter, water, sanitation, food and other provisions in emergency situations, and other guidance is available on assessing mental health and psychosocial needs and resources (WHO and UNHCR 2012). These public health standards cover worst-case-scenario humanitarian crisis and emergency situations. In addition, all EU member states have signed the *International Covenant on Economic, Social and Cultural Rights*, that places 'the right to health' irrespective of nationality as a priority, ratified in Article 12 (see Brannan et al 2016).

Despite the existence of these global standards and international agreements, this paper relates to other research in showing that refugees in Europe are being excluded even from these basic public health benchmarks. DOTW (2013) have produced the most comprehensive contemporary studies on undocumented migrants health in Europe, with information gathered from 8,412 patients and 10,968 medical consultations in seven European states including France. Their study found 9% of undocumented migrants to be sleeping rough; the report particularly emphasizes the stress-related impacts for refugees of not knowing where they would be sleeping on any given night (echoing Whitehead et al, 2016). Additionally, in a review of available evidence in relation to the public health needs of migrants, other scholars have emphasised the role of

environmental conditions in shaping refugee health: the need to ensure adequate water supply, sanitation, hygiene and avoiding crowded living conditions which might help spread of respiratory infections, gastroenteritis and scabies among other illnesses among the affected population (Semenza et al 2016).

Recurring themes in relation to health conditions in refugee encampments revolve around hygiene conditions, respiratory problems, the spread of infections, the prevalence of HIV and the ubiquity of gastrointestinal illnesses. A number of studies have found gastrointestinal illnesses to be among the most significant problems within refugee camp settings, including in Senegal (Sow et al 2002), Palestine (Abu Mourad 2004, Yassin et al 1999) and Mexico (Weinhold 2002). Abu Mourad (2004: 140) in particular draws out the importance of environmental health conditions in preventing such illnesses, finding a negative correlation between the presence of flush toilets and parasitic infections. Similar links have also been drawn between environmental conditions and respiratory illnesses. Ahmed et al (2012) in their study on Kenyan refugee camps explain how camp-like conditions involving large groups of people in confined spaces leave people exposed to respiratory illnesses. But as Luby et al (2004) have suggested, these can be addressed partly through ensuring that adequate handwashing facilities exist, to counteract the spread of pathogens. Previous public health studies in refugee encampments have focussed on officially recognized refugee spaces, which are often administered by the UN or state authorities (Sow et al 2002; Ahmed et al 2012). Here we present the first study – to the best of our knowledge - that examines public health conditions in an informal or ‘makeshift’ camp, which are fast becoming dominant spaces of refugee migrations (Davies & Isakjee 2015).

5. METHODS

This study combines quantitative methods with qualitative group interviews and field observations to provide a comprehensive assessment of the environmental health conditions and associated vulnerability of migrant residents in the Calais refugee camp (see Ulin et al 2012). The principal fieldwork took place in July 2015, and the key areas of focus were; food and water, shelter, and hygiene and sanitation. Data was collected from 11 sub-camp sites generally consisting of people from the same country or sharing a common language. To ensure a robust dataset, these sites were purposively selected for maximum variation to cover a range of geographical locations across the camp and to include groups from a range of origin countries, age groups, and group size. The selected camp sub-site characteristics are summarised in Table 1. The sub-site locations were logged using GPS and are shown in Figure 2.

Some limitations in relation to the study are worth noting. As previously indicated, 96.8% of the camp was male in 2015. Most female refugees in Calais were housed in an adjacent accommodation centre to which researchers did not have access. However, a small number of female migrants did reside in the informal camp. In a survey conducted by RRDP (2016, 26), 46% of the female residents reported feeling unsafe inside the camp. In a study specifically on sexual and reproductive health in Calais, it was concluded that the camp did not meet minimum standards for sexual and reproductive health or provide adequate HIV protection (Finnerty et al 2016). Reports of sexual violence were also encountered in this study (ibid).

Table 1: *Sub-camp sample characteristics*

Sub-camp site	Reported number of residents	Country of origin of inhabitants
1	5	Sudan
2	60	Sudan
3	15	Sudan and Pakistan

4	8	Egypt and Syria
5	40	Iraqi Kurdistan
6	7	Afghanistan
7	60	Sudan
8	20	Pakistan
9	5	Afghanistan
10	10	Afghanistan
11	25	Ethiopia

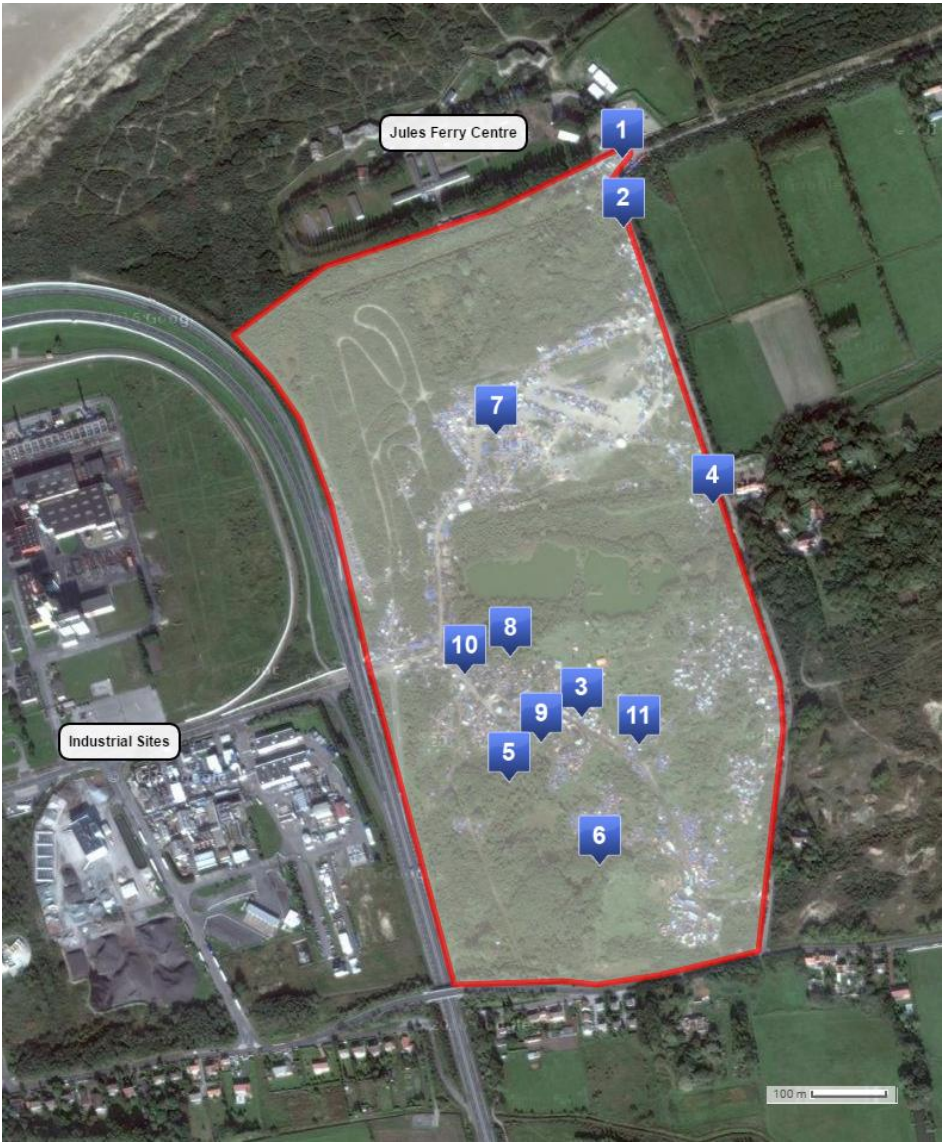


Figure 2: Map showing location of Calais camp and distribution of eleven sub-camps surveyed for this project.

5.1 FOOD AND WATER

Multiple methods were used to assess food and water safety. Stored food and water samples were taken from the majority of sites for microbiological analysis. There was an absence of food in sub-camps 5, 7 and 9 and so sampling was not possible. All food samples were from sources intended for consumption without further processing by people in the sub-camp, and water samples were taken from supplies which had been filled from the main camp supply. Food samples were analysed for the presence of pathogenic bacteria (cfu/gr); *Clostridium* spp., *Bacillus cereus*, *Escherichia coli* spp., and *Salmonella* spp. Water samples were analysed for the presence of pathogenic bacteria and bacteria indicative of faecal contamination (cfu/30ml); *Escherichia coli* spp., *Enterobacter cloacae*, and *Klebsiella pneumoniae*. Most Probable Number coliform tests were also carried out.

Environmental swabs (of 10cm x10cm areas) of a selection of food preparation surfaces, crockery, and cooking equipment were taken each of the sub-camps, with the exception of sub-camp 9, using sterile equipment. Swabs were taken of a toilet door handle located on the main track, a long-drop toilet cover handle, and a water point tap head. Environmental swabs were analysed for the presence of pathogenic bacteria and bacteria indicative of faecal contamination (cell/100cm²); *Escherichia coli* spp., *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Salmonella* spp. and *Clostridium* spp.

All samples were collected using sterile containers and stored in an insulated cool-bag before placing in a mobile freezer unit operating at -18°C. The mobile freezer unit temperature was monitored twice daily using a calibrated thermometer. All samples were labelled immediately and double-bagged. Samples were analysed at the University of Birmingham food laboratories, and sample data was analysed against current standards and known infective doses.

In addition, field observations were made of food and water storage and preparation practices, including the separation of raw and ready to eat foods, and the ability wash fruit and vegetables. Arrangements for the washing of hands, and ability to effectively clean surfaces and equipment were noted and individual and group interviews covered the same issues, including knowledge of food safety practices. The availability of food, sources of food and water, hunger, and reported symptoms of foodborne illness; diarrhoea, vomiting, fever or stomach cramps were also discussed.

5.2 SHELTER

Field notes were made on the type of shelter in each sub-camp, its construction (including use of flammable materials and insulation), condition, stability, any means of heating, ventilation, and lighting. Means of fighting fires and raising the alarm were also noted, in addition to proximity to other shelters and access points for emergency service. Cases of overcrowding or inadequate shelter for the number of residents were also noted. During group and individual interviews, residents were asked about their experiences of living in the shelters.

5.3 HYGIENE AND SANITATION

Group and individual interview participants were asked about facilities for personal cleanliness including washing bodies, bedding and clothes, in particular, focussing on access to hot water, hand washing facilities, soap, toothpaste and the disposal of wastewater. Interviews also covered discussion of the toilets including the availability, cleanliness, security, and user acceptability of the facilities provided. Observations were made on the availability and cleanliness of toilets, and associated handwashing facilities, hygiene practices, evidence of open-air defecation, as well as the approximate distance of the hygiene facilities from sub-camp locations.

The research team also made contemporaneous audio notes of observations and items of interest, and in addition recorded their reflections at the end of each day on site. All audio and written records were transcribed and coded against the key themes of food and water, shelter, and hygiene and sanitation.

6. RESULTS AND DISCUSSION

6.1 FOOD AND WATER



Figure 3: Portions of food salvaged from the Jules Ferry centre stored unsafely inside makeshift shelters without adequate refrigeration (Sub-camp 3)

Residents of the camp were ostensibly entitled to one meal a day free-of-charge from the central kitchens at the adjacent state-sponsored distribution centre. However, evidence from NGOs in the camp suggested that at the time of the study, the available free food would only cover approximately two-thirds of the population of the camp, and this assertion was supported by evidence in group-interviews which described a shortage of food. Hunger was reported as being commonly experienced by residents in each of the eleven sites. In addition, there were frequent reports in group-interviews of constipation owing to the lack of fruit and vegetables and a reliance on white bread as a staple. Where possible, this single meal was partially kept and supplemented later that day or the next, with donated food, most commonly pasta or tinned beans (Figure 3). The inadequate levels of sustenance available from the French state in this instance is among the most fundamental forms of biopolitical othering (Foucault 1978); reducing refugees to a state of hunger in this way becomes a political device that reproduces refugee biologies as lives that can be ‘wasted’ (Bauman 2004).

There were no facilities recorded within any of the sites for the safe preparation and storage of food. There were no refrigeration facilities, no supplies of hot water, no sanitiser available for the effective cleaning of



Figure 4: A leaking drinking water pipe in the Calais camp, presenting a risk of supply contamination. One water tap tested positive for pathogenic bacteria indicative of faecal matter.

Residents were generally aware of basic food safety controls, such as handwashing, equipment cleaning, separation of raw and ready to eat foods, cold storage of high-risk foods and the need to cook and reheat food thoroughly. However, the French state's decision not to intervene with the provision of such facilities made adhering to many of these measures impossible. The inability to wash foods such as vegetables effectively presents a risk of *E.coli* contamination from soil on produce; ingestion of *E.coli* 0157 can cause symptoms including severe diarrhoea (Swerdlow et al 1992), and exposure even at low doses, can be fatal or lead to life-changing illness (Food Standards Agency 2014).

Water facilities were also found to be inadequate. There were five piped cold water points in the camp; however at one point the pipe was leaking, presenting a risk of contamination of the supply (Figure 4). There was no hot water supply. Residents were not provided with suitable containers for the collection and storage of water and were frequently observed to be using chemical containers, some labelled as having previously contained corrosive substances (Figure 5). The containers could not be effectively cleaned or covered and this led to the contamination of drinking water which others have shown to increase chances of diarrhoea (Abu Mourad 2004). Indeed all samples from water containers contained harmful levels of *Enterobacter Spp*, which among other health issues is also linked to the prevalence of waterborne infections, especially for individuals with pre-weakened immune systems (Exner et al 2005). A sample from one container was found to have 200 (cfu/30ml) of *E. coli* which can cause diarrhoea. Five of the samples also had levels of 10-39 (cfu/30ml) of *Klebsiella pneumoniae* present which can cause pneumonia and other respiratory infections (Nordmann et al

2009). A high incidence of chest infections amongst residents was reported by medical staff for the charity Doctors of the World, who were treating camp residents for various illnesses.



Figure 5: A container formally used to store a corrosive chemical (Methyl-1H-benzotriazole) is used by a group of refugees to store and transport potable water.

6.2 SHELTER

Shelters were vastly inadequate and directly exacerbating the ill-health and psychological distress suffered by some residents of the camp. With state provision of shelter again withheld, it was left to charities to provide limited materials or donated tents which would act as living quarters. Accommodation was found to consist of either timber-framed shelters with plastic sheeting or of tents, donated by humanitarian charities or ad hoc voluntary groups (see Figure 1). Table 3 shows the types and condition of shelters found at each site. Several makeshift shelters and tents were found to be leaking rainwater to varying degrees, and all sites reported condensation build-up internally making bedding damp. All residents interviewed described being cold at night and some interviewees connected cold and damp conditions to the wheeziness and breathing difficulties they had been experiencing. In all, respondents in six sites reported with respiratory problems, likely exacerbated by the open fires and burning of plastic for heating and cooking purposes. In terms of their improvised condition, none of the shelters surveyed were in line with UNHCR recommendations for emergency refugee spaces (UNHCR 2007).

Table 3: *Types and condition of shelters*

Site	Type and condition of shelters
1	Wooden frame with uninsulated plastic sheeting. Leaking in places.
2	Wooden frame constructed of branches with plastic sheeting. Thinly insulated with blankets.
3	Wooden frames with uninsulated plastic sheeting. Some structures were leaking.
4	Wooden frame constructed of branches with plastic sheeting. Thinly insulated with blankets. Structure was reported to rock in windy conditions.
5	Tent and wooden frames with uninsulated plastic sheeting. One person sleeping in open air under a tree.
6	Tent in reasonable condition.
7	Wooden frames with uninsulated plastic sheeting. Some small tents.
8	Wooden frames with uninsulated plastic sheeting.
9	Tent in reasonable condition
10	Tents in reasonable condition.
11	Tents. One tent was unstable.

All structures were made of flammable material and with the exception of the Kurdish sub-camp (Site 5), were built in very close proximity to each other allowing flames to spread quickly in the event of fire, and restricting emergency access. None of the sites were found to be equipped with firefighting equipment or any means of raising the alarm. The use of naked flames for lighting, and of open fires for cooking and heating leads to a high risk of fires starting in the camp. Indeed fires have started and spread in parts of the camp regularly since the study was completed, including incidents in November 2015 in which 40 shelters were destroyed (Smith, 2015). There was also a risk of carbon monoxide poisoning where combustion of fuel for cooking and heating took place in enclosed spaces.

Due to a lack of adequate refuse storage and collection in the camp, there were large piles of waste, including food debris, in close proximity to living structures, which provided food and harbourage to pests including rats and mice. This further echoes observations by Bauman (2004) on the juxtaposition of unwanted materials with populations deemed 'disposable'. Interviews revealed the widespread presence of vermin, with nine sites reporting the presence of rats, one noticing cockroaches, three reporting bedbugs and nine reporting the presence of lice. As LeMay (2015) reminds us, these pests are significant vectors of serious illness. Along with the lack of basic sanitation highlighted in the next section, these abject environmental conditions contributed to the dehumanising and 'corrosive' (McLoughlin and Warin 2008: 261) nature of the camp.

6.3 HYGIENE AND SANITATION



Figure 6: A typical view of the inside of one of the overused toilets. There were insufficient numbers of flush-toilets to serve the camp population, failing to meet ‘Sphere’ standards.

Toilet facilities were inadequate in number and condition, with 40 toilets available in the entire camp, and many of those found to be heavily soiled or full and unusable (Figure 6). The ratio of toilets to residents was one per 75 residents; the UNHCR guidance for refugee camps recommends one toilet per family unit (6-10 people) or one per 20 residents in emergency situations (UNHCR 2007, 553). Residents frequently reported the toilets to be in a dirty condition, and this was verified by field observations as well as during interviews:

‘When I go to Salaam [In the Jules Ferry Centre] I use the toilets. They have (some) here but I don’t go.... There are too many people... They’re not clean.’ (Afghan participant, Site 10)

Some ‘long drop’ toilets in large wooden structures provided by an NGO were found to be particularly unacceptable to residents, as they could not be effectively cleaned, were prone to ‘splashing’, and attracted large numbers of flies which were breeding in the effluent. As Abu Mourad (2004) has shown, the lack of flushing toilets in refugee settings has been linked to increased parasitic infections and gastrointestinal illnesses (echoed by UNHCR 2007). Unsurprisingly, many residents resorted to defecating in the open, and large areas of the camp were found to be visibly contaminated. Toilet facilities were commonly reported to be a source of distress to residents, impacting on their resilience to cope with other challenging conditions:

‘If you are to tell them to build us some suitable camps up here...with some toilets then it would be important and we would be able to handle it [living] here.’ (Kurdish participant, Site 5, Group interview)

There were no handwashing facilities associated with the toilets, facilitating transmission of food-poisoning bacteria via the faecal-oral route. At all sites, hands were washed only with cold water and with the exception of two sites where a limited amount of washing liquid and shampoo was sourced by migrants themselves, no other soaps or gels were available for that purpose. It is in relation to the lack of such basic sanitary conditions that Redfield (2005: 329) posits the 'pit latrine' as the most elementary expression of a discomforting and minimalist biopolitics. It is within these conditions that lives, "shrink to the immediacy of survival, shedding even the everyday trappings of customary dignity" (ibid).

Residents at all sites reported difficulties with washing themselves, their clothes and their bedding. Hot showers were available for a limited period daily in the Jules Ferry Centre, accessible via a ticketing system. However the facilities were vastly inadequate for the number of people: around 400 daily shower places for over 3000 residents were reported with lack of access a common issue. DOTW staff reported to the research team that one in five residents they were seeing for a range of other conditions, were also presenting with scabies. Yet with no adequate facilities for washing bedding and clothes for the vast majority of the population, treating scabies was deemed impossible by the camp's volunteer doctors.

7. CONCLUSION

The research presented in this paper represents the first attempt at a comprehensive environmental or public health survey at an informal refugee camp, where no single state or supra-state organisation oversees conditions. The research demonstrates how the politics of exclusion results in 'biopolitical othering' of migrants, with profound health consequences for disposable populations (Fassin 2001). Inadequate shelter, food and hygiene provision creates health environments in which pathogenic bacteria, may thrive and cause illness. By focussing on the minutia of a broader humanitarian crisis, we have shown how the biopolitical hierarchization of migrants as being beneath the value of regular citizens, translates into harmful consequences even at the microbiological scale. The biopolitical othering is seen to be operationalised through each of the areas in which provision is denied or limited. This paper has shown how shortcomings in supply of food creates hunger; a lack of hygiene facilities and promotes gastrointestinal illnesses; a lack of formal provisions of shelter leads to the exposure of vulnerable migrants to the elements and hazards such as fire risk, which have been shown to injure migrants and their health in Calais. Beyond the physical injury too is the stark elementary form of iniquity and indignity that is experienced as a result of being unable to use a toilet, or having to defecate in open ground, close to the sleeping quarters of fellow migrants. The researchers for this study were unable to ethically construct an appropriate survey to explore psychological illnesses of migrants comprehensively, but data from qualitative interviews demonstrates how being made to live in conditions in which privacy and dignity is stripped, causes migrants to feel stressed.

However we also intend for this paper to connect health consequences within the broader political landscape to add a critical dimension to this work. The European Union Agency for Fundamental Rights advocates for an appropriate public health environment as a basic right for irregular migrants (FRA 2015), yet as revealed in this paper, the actual experience of public health for many refugees is starkly different. Indeed, the dire public health situation we have demonstrated in the Calais camp is politically *useful* to the French state. It forms part of a wider border enforcement regime; a 'strategy [that] seeks deportation indirectly' (Castro 2015) by creating a public health situation that is deliberately hazardous. Public health, or rather the denial of publicly acceptable health conditions, is therefore a tool of coercive governance, the aim no longer being to forcefully remove refugees and asylum seekers, "but

to establish conditions similar to the ones unauthorized migrants suffer in their states of origin in order to force their “self-deportation” (Castro 2015: 245). Seen this way, diarrhoea and vomiting are not just ailments, but also symptoms of political strategies of exclusion.

Though the latest manifestation of the Calais camp was demolished in late 2016 after 18 months of existence, the political situation in Europe has not changed. Makeshift camps will remain a permanent fixture on the European landscape. This reemphasises the importance of public health researchers to be attentive to wider political dynamics and to embrace interdisciplinary. As the political strategies of refugee control fall ethically short, it is important for researchers to catalogue the specifics of these shortcomings - and to draw out the very material impacts this is having on refugee bodies. By doing so we will be able to map out an emerging set of health exclusions emanating directly from contemporary migrant crises.

Other area which authors may want to consider is the tension between official EU statements about the "refugee crisis" and the present situation in which "otherness" and exclusion seems to be part of the disuasory strategy imposed by institutions. Documents like http://fra.europa.eu/sites/default/files/fra_uploads/fra-2015-cost-healthcare_en.pdf advocate for an appropriate public health environment as a right of settlers but the "inaction" showed by the European institutions suggests a possibly purposive neglect.

ACKNOWLEDGEMENTS

The project was funded by an ESRC urgency grant. We would like to thank *Doctors of the World* for their assistance in the field and all participants. We also thank Helen Onyeaka, Elaine Mitchell and Alaa Alaizoki of the University of Birmingham food laboratories for their assistance.

REFERENCES

- WHO and UNHCR, 2012. *Assessing mental health and psychosocial needs and resources: toolk humanitarian settings*. World health Organization.
- Abu Mourad, T.A., 2004. Palestinian refugee conditions associated with intestinal parasites and diarrhoea: Nuseirat refugee camp as a case study. *Public health* 118, 131-142.
- Ahmed JA, Katz MA, Auko E, Njenga MK, Weinberg M, Kapella BK, Burke H, Nyoka R, Gichangi A, Waiboci LW, Mahamud A. 2012. Epidemiology of respiratory viral infections in two long-term refugee camps in Kenya, 2007-2010. *BMC infectious diseases* 17 1.
- Andersson, A., U. Rönner and P. E. Granum, 1995. What problems does the food industry have with the spore-forming pathogens *Bacillus cereus* and *Clostridium perfringens*? *International Journal of Food Microbiology* 28, 145-155.
- Bauman, Z., 2004. *Wasted lives: Modernity and its outcasts*. John Wiley & Sons, London.
- Brannan, S., Campbell, R., Davies, M., English, V., Mussell, R. and Sheather, J.C., 2016. The Mediterranean refugee crisis: ethics, international law and migrant health. *Journal of medical ethics* 42, 269-270.
- Brynstad, S. and P. E. Granum, 2002. *Clostridium perfringens* and foodborne infections. *International Journal of Food Microbiology* 74, 195-202.
- Bullard, R.D., 1990. *Dumping in Dixie: Race, class, and environmental quality* Boulder, CO: Westview Press.
- Castro, A.F.H., 2015. From the "Bio" to the "Necro": the human at the border. *Resisting Biopolitics: Philosophical, Political, and Performative Strategies*, 71, p.237.
- Cutler, S.J., 2016. Refugee crisis and re-emergence of forgotten infections in Europe. *Clinical Microbiology and Infection* 22, 8-9.
- Davies, T. and Isakjee, A., 2015. Geography, migration and abandonment in the Calais refugee camp. *Political Geography* 49, 93-95
- Davies, T., Isakjee A., Dhesi, S. 2017 Violent inaction: the necropolitical experience of refugees in Europe. *Antipode*
- DOTW, 2013. Access To Healthcare In Europe In Times Of Crisis And Rising Xenophobia [accessed via http://www.medicosdelmundo.org/index.php/mod.documentos/mem.descargar/fichero.documentos_MdM_Report_access_healthcare_times_crisis_and_rising_xenophobia_edcfd8a3%232E%23pdf 07/06/2016]
- Evans, J., 2011. Exploring the (bio)political dimensions of voluntarism and care in the city: The case of a 'low barrier' emergency shelter. *Health & Place* 17, 24-32.

Exner, M., Kramer, A., Lajoie, L., Gebel, J., Engelhart, S. and Hartemann, P., 2005. Prevention and control of health care-associated waterborne infections in health care facilities. *American journal of infection control* 33, 26-40.

Fassin, D., 2001. The biopolitics of otherness: undocumented foreigners and racial discrimination in French public debate. *Anthropology Today* 17, 3-7.

Finnerty, F., Nunes, C., Gilleece, Y. and Richardson, D., 2016. Does the new 'jungle' migrant camp in Calais meet the intra-agency working group (IAWG) minimum standards for sexual and reproductive health (MISP) in an emergency situation?. *Sexually transmitted infections*, 92(4), pp.291-291.

Food Standards Agency (2014) E.coli 0157 Control of Cross Contamination. Guidance for food business operators and local authorities [accessed via <https://www.food.gov.uk/sites/default/files/ecoli-cross-contamination-guidance.pdf>]

Foucault, M., 1978. *The history of sexuality* (R. Hurley, Trans.). New York: Pantheon.

Foucault, M., 2003. *Society Must be Defended: Lectures at the College de France 1975-1976*. Picador, New York.

FSA., 2015. Cost of exclusion from healthcare: The case of migrants in an irregular situation. *European Union Agency for Fundamental Human Rights* [accessed via http://fra.europa.eu/sites/default/files/fra_uploads/fra-2015-cost-healthcare_en.pdf]

Grove, N.J. and Zwi, A.B., 2006. Our health and theirs: forced migration, othering, and public health. *Social Science & Medicine* 62, 1931-1942.

Harper, I. and Raman, P., 2008. Less than human? Diaspora, disease and the question of citizenship. *International Migration* 46,3-26.

Joint Ministerial Declaration., 2015. Managing migratory flows in Calais: joint ministerial declaration on UK/French co-operation [accessed via https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/455162/Joint_declaration_20_August_2015.pdf]

Kim, J.-B., J.-M. Kim, C.-H. Kim, K. S. Seo, Y.-B. Park, N.-J. Choi and D.-H. Oh., 2010. Emetic toxin producing *Bacillus cereus* Korean isolates contain genes encoding diarrheal-related enterotoxins. *International Journal of Food Microbiology* 144, 182-186.

Kupferschmidt, K., 2016. Refugee crisis brings new health challenges. *Science* 352, 391-392.

LeMay, M.C., 2015. *Doctors at the Borders: Immigration and the Rise of Public Health*. ABC-CLIO.

Luby, S.P., Agboatwalla, M., Painter, J., Altaf, A., Billhimer, W.L. and Hoekstra, R.M., 2004. Effect of intensive handwashing promotion on childhood diarrhea in high-risk communities in Pakistan: a randomized controlled trial. *Jama*, 291(21), pp.2547-2554.

Marmot, M., 2010. *Fair Society, Healthy Lives: Strategic Review of Health Inequalities in England post 2010*. UCL., London.

- McLoughlin, P. and Warin, M., 2008. Corrosive places, inhuman spaces: Mental health in Australian immigration detention. *Health & Place* 14, 254-264.
- Millner, N., 2011. From “refugee” to “migrant” in Calais solidarity activism: Re-staging undocumented migration for a future politics of asylum. *Political Geography* 30, 320-328.
- Muller, B., 2004. Globalization, security, paradox: towards a refugee biopolitics. *Refuge: Canada's Journal on Refugees* 22, 1.
- Nordmann, P., Cuzon, G. and Naas, T., 2009. The real threat of *Klebsiella pneumoniae* carbapenemase-producing bacteria. *The Lancet infectious diseases* 9, 228-236.
- Questier, J., 2011. Food and Food Safety. *Clay's Handbook of Environmental Health*. S. Battersby. Spon Press, Abingdon. 20th Edition 315-415.
- Redfield, P., 2005. Doctors, borders, and life in crisis. *Cultural Anthropology*, 20(3), pp.328-361
- Reinisch, J., 2015. ‘Forever Temporary’: Migrants in Calais, Then and Now. *The Political Quarterly* 86, 515-522.
- RRDP (2016) ‘The Long wait: filling in the gaps relating to refugees and displaced people in the Calais camp’. Online Report, London, April.
- Semenza, J.C., Lindgren, E., Balkanyi, L., Espinosa, L., Almqvist, M.S., Penttinen, P. and Rocklöv, J., 2016. Determinants and Drivers of Infectious Disease Threat Events in Europe. *Emerging infectious diseases* 22, 581.
- Smith, J., 2016. Thinking beyond borders: reconceptualising migration to better meet the needs of people in transit. *International Journal of Public Health* 1-2.
- Smith, M. 2015. Calais migrant camp on fire as France reels from Paris terror attacks. *Mirror* [accessed via <http://www.mirror.co.uk/news/world-news/calais-migrant-camp-fire-france-6830330>].
- Smith, M., 2015 Calais migrant camp on fire as France reels from Paris terror attacks, *The Mirror* [accessed via <http://www.mirror.co.uk/news/world-news/calais-migrant-camp-fire-france-6830330>]
- Sow S, de Vlas SJ, Engels D, Gryseels B., 2002. Water related disease patterns before and after the construction of the Diama dam in northern Senegal. *Ann Trop Med Parasitol* 96, 575—86.
- Sparke, M., 2009. Unpacking economism and remapping the terrain of global health. In *Global Health Governance* (pp. 131-159). Palgrave Macmillan UK
- Sphere Project., 2016. Humanitarian Charter and Minimum Standards in Humanitarian Response [accessed via <http://www.spherehandbook.org/>].
- Swerdlow, D.L., Woodruff, B.A., Brady, R.C., Griffin, P.M., Tippen, S., Donnell, H.D., Geldreich, E., Payne, B.J., Meyer, A., Wells, J.G. and Greene, K.D., 1992. A waterborne outbreak in Missouri of *Escherichia coli* O157: H7 associated with bloody diarrhea and death. *Annals of Internal Medicine* 117, 812-819.
- Ulin, P.R., Robinson, E.T. and Tolley, E.E., 2012. *Qualitative methods in public health: a field guide for applied research*. John Wiley & Sons, London.

UNHCR., 2007. Handbook for emergencies (third edition) [accessed via [http://www.ifrc.org/PageFiles/95884/D.01.03.%20Handbook%20for%20Emergencies UNHCR.pdf](http://www.ifrc.org/PageFiles/95884/D.01.03.%20Handbook%20for%20Emergencies%20UNHCR.pdf)]

UNHCR., 2015. UNHCR Mid-Year Trends 2015. Geneva.

Walker, G., 2009. Beyond distribution and proximity: exploring the multiple spatialities of environmental justice. *Antipode*, 41(4), pp.614-636.

Weinhold B., 2002. The diarrhea dilemma. *Environ Health Perspect* 110, 590-591.

Whitehead, M., Pennington, A., Orton, L., Nayak, S., Petticrew, M., Sowden, A. and White, M., 2016. How could differences in 'control over destiny' lead to socio-economic inequalities in health? A synthesis of theories and pathways in the living environment. *Health & Place* 39, 51-61.

Yassin, M.M., Shubair, M.E., Al-Hindi, A.I. and Jadallah, S.Y., 1999. Prevalence of intestinal parasites among school children in Gaza City, Gaza Strip. *Journal of the Egyptian Society of parasitology*, 29(2), pp.365-373.