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Pandemic imaginaries of interspecies relatedness: More-than-human microbial methods on the bus

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The study of human–non-human relations, within a conceptual framework that decentres human exceptionalism (Menon and Karthik, 2017) and challenges the nature–society separation with its legacy of presenting the natural world as somehow 'out there', has gained traction within the social sciences and humanities (Büscher, 2022; Greco, 2022; Haraway, 2016; Whatmore, 2006; 2017). This body of work has started to reconceive ecological politics through mapping out how humans are situated in complex social relations with biological and physical worlds. Lively discussions have ensued, foregrounding multispecies geographies (Gillespie and Collard, 2015), vitalist ecologies (Bennett, 2010; Braun, 2015), and post-humanist theorising of more-than-human entanglements (Anderson, 2014; Wolfe, 2010). Within this field, the study of human–non-human relations has been dominated by well-established cultural interest areas; for example, animals, food-stuff and plants. There is also work that engages with non-human aspects of planetary life that is harder to grapple with due to the temporality, spatiality and inhuman materiality of multispecies worlds, such as the geological (Clark and Yusoff, 2017). Social studies of the microbial sit between these points of human–non-human scholarship. Viruses, bacteria, archaea, fungi and protists are methodologically trickier to study within social relations as they are challenging to witness as material, recognisable everyday objects in relation to human practices. And yet the COVID-19 pandemic demonstrated how the very real threat of infection was accompanied by multifarious imaginings of microbial agency and risk that radically changed everyday life.

Over the last two decades, social and economic anxieties associated with antimicrobial resistance, food and zoonotic disease risk, as well as the recent pandemic, have prompted a surge in social and cultural studies of the microbial (Hinchliffe and Bingham, 2008; Hinchliffe et al., 2018; Mather and Marshall, 2011) and the human microbiome (Greenhough et al., 2020). This literature brings attention to the vitality, materiality and dynamism of microbial life, when operating in assemblage with other non-humans – air, water, architecture, etc., co-producing worlds beyond human control (see Bosco, 2006; Hinchliffe and Whatmore, 2017; Whatmore, 2017). Human existence is always a more-than-human achievement (Greenhough, 2014; see also Latour, 1993; Stengers, 1997). Unlike the conceptual and theoretical developments, methodological developments to cater for the challenges of studying specific human–non-human relations have not kept pace. There is urgent need for further development of more-than-human methods that support sensing, understanding and 'doings' *with* microbial worlds, to add to existing work in this field (Dowling et al., 2017; see also Adams et al., 2021; Buller, 2015; Hodgetts and Lorimer, 2015; Swanson, 2017). This chapter addresses this absence, outlining the critical imperative for methodological innovation capable of advancing novel representations and literacies around interspecies relatedness.

Amidst calls to develop new techniques that 'allow us to engage with diverse and multiple worlds and non-human agencies' (Greenhough, 2014: 101), this chapter advances a more-than-human microbial methodology, using the example of public health videos created during the recent pandemic. Taking the lead from geography's 'creative turn' in research methods (Veal and Hawkins, 2020), the more-than-human microbial methodology presented here draws on three bodies of literature: filmmaking as research; affect theory; and artistic microbial methods. Participatory videos and filmmaking can work against and beyond text (Garrett, 2011; Jacobs, 2013) and are argued to better attune to the more-than-human dimensions of life (Lorimer, 2010; Richardson-Ngwenya, 2014). Others have put forward affect and emotion as informing cognition, behaviours and socio-political interactions in ways that may not be fully perceptible (Anderson, 2006; Gregg and Seigworth,

2010). Affect is central to the production of 'non-human charisma' (Lorimer, 2017) while emotions shape human relations to worlds unseen but sensed (Roe et al., 2021). Scholarly interest in the unfolding of social worlds through emotions, affects, practices and multisensual forces has found synergies with artistic approaches to microbial research that illustrate other ways of knowing and communicating the micro-scale (see Evans and Lorimer, 2021; Macduff et al., 2017). An important contribution from Roe et al. (2019) foregrounds aesthetics and imaginaries in illustrating microbial interactions *with* humans in the act of infection. Such work advocates for non-anthropogenic modes of researching *with* microbial worlds and attending to the material and imaginative, subtle and dynamic, forces they engineer (see Hinchliffe et al., 2005). The COVID-19 pandemic signals a critical imperative to develop microbial literacy (see Timmis et al., 2019). By microbial literacy the authors refer to the social and cultural knowledges and values that shape non-specialist publics' *encounters* with medico-scientific information about microbial communities and their risk. And it involves attuning to how individuals and different community groups (whether by age, race, ethnicity, class, etc.) *apply* information about microbial risk (hazard identification, sources of infection, strategies of prevention, care of self or other, etc.) to their routines and practices in ordinary settings and everyday life.

The main portion of this chapter is framed around a conversation that took place on the video calling platform Zoom between co-investigator and artist-academic Paul Hurley (PH) and co-investigator and landscape scholar Charlotte Veal (CV) in April 2022 as part of the project Routes of Infection, Routes to Safety: Understanding Risk and the Viral Imagination on Public Transport; they are two members of a four-person research team. The other two members were principal investigator and cultural geographer Emma Roe and co-investigator and microbiologist Sandra Wilks. The thoughts and ideas expressed in Veal and Hurley's conversation reflect and relay hours of discussion between the whole team during the project. Roe and Wilks have co-authored ideas central to this chapter, discussed and edited it. Work on developing this chapter was part of the post-research reflection, evaluation and project write-up phase that included a stakeholder report (Roe et al., 2021), participatory workshops with research participants

and an Arts and Humanities Research Council (AHRC) evaluative summary. A reflexive conversation, central to the collaborative model of working throughout the project, seemed an appropriate written form to share the team's methodological experimentations. Deliberately dialogical, the chapter raises questions about how stories of the trials and tribulations of research, particularly in fast-paced and fluctuating socio-political and scientific contexts, are told. Lightly edited, the format is also intended to be provocative and free flowing, creating a *reflective* exploratory space to think about and push thinking on the more-than-human and microbial methods specifically.

Routes to Safety's aim was to understand the personal application of infection prevention measures beyond clinical settings and to build confidence in bus travel during a time when public transport use was being discouraged (for example, by Transport Secretary Grant Shapps, quoted in Davies, 2020). The field work included ethnography and semi-structured research interviews (between January and October 2021). The team, on the request of UK Research and Innovation (UKRI), made a commitment that more than 50 per cent of research participants would be drawn from members of Black, Asian or Minority Ethnic (BAME) communities in order to capture the disproportionate impact the pandemic was having on BAME communities (Public Health England, 2020a). Hence, from the outset the team established a collaboration with the Bristol Somali Youth forum who helped recruit from their community. The project concluded with producing four animated films with public health messaging, grouped under the title 'You're Never Alone on the Bus', with filmmaker Joseph Turp.

The chapter reflects on the processes of concept-inception, team-discussion and dissemination-reception of these films to/by various audiences. It argues that developing novel representations and literacies around interspecies relatedness in shared public spaces like the bus is vital to facilitating new understandings not only of human–microbial relations in the context of COVID-19, but also how more-than-human methods might be applicable to infection prevention campaigns during future public health challenges (winter colds, flu, norovirus) and knowledge-making around other global health challenges such as antimicrobial resistance. It is structured under four sub-headings: context for the film; microbial aesthetics;

politics of microbial aesthetics; and scriptwriting, before concluding with a call for critically creative more-than-human microbial methods.

Context for the film

Charlotte Veal (CV): Paul, let's start with the background context for the public engagement dimension of the research project. This was a dual challenge underscored by UK Government COVID-19 messaging that, from the outset, warned the public against public transport use. On the one hand, many bus users expressed limited microbial literacy. On the other hand, because of a long history of stigmatising the bus as 'dirty' or a space utilised only by lower-income sectors of society (see TfL, 2012), our attempts to address this tension were met by bus operators' reluctance. Operators were hesitant to represent the microbial in their communications about infection prevention measures such as physical distancing, hand hygiene and mask wearing. Can you reflect on how the concept for the film developed within this context and who was involved?

Paul Hurley (PH): So, we had a filmmaker on board from the outset, Joseph Turp. Joe had worked with the research team on Mapping Microbes in 2016; a project that developed creative visualisations of surface transmission and hand hygiene in a mock-hospital ward (Roe et al., 2019). Joe was involved in the developmental phase of Routes to Safety and this helped coordinate our thinking on outputs. The team met regularly with Joe to discuss initial findings and how we might translate them into visual and informational materials around infection prevention. Discussions focused on ethnographic findings onboard buses and at bus stops – observing passenger behaviours, social interactions and mundane encounters with bus architecture – as well as initial interviews with bus drivers and bus users (beginning in April 2021).

CV: The creative process was also informed by our own pandemic-shaped everyday encounters with infection prevention and protection: by things that we'd heard from friends; by our experiences of relatives being hospitalised and of children being in school; by those daily interactions that felt 'new'; and by the negotiations that we

were having with the 'virus' through ordinary tasks like catching a bus, going to the supermarket or inviting someone into our home.

PH: The ideas for the films came out of our own lived reality that we were simultaneously researching. It was a very dynamic situation and while the team planned to do something like the Mapping Microbes project, it became clear that Routes to Safety needed to look beyond surface transmission to consider airborne transmission. The aesthetic of our UV-lit microbial worlds created during Mapping Microbes also bore an uncanny resemblance to some public information films released by Public Health England (2020b). We pledged to continue innovating rather than to rehearse the same approach.

CV: The creative process also had to engage constructively with people's everyday lived experiences of a rapidly evolving medical and political context and the associated affective and emotional forces cultivated under the framework of government public health messaging which enhanced a sense of risk.

PH: When research began in January 2021, the team had to go through an intensive process of ethical and health and safety approval to travel on buses. It's strange to think now about the intensity of anxiety and perceived risk from boarding a bus. Back then, we were in a very different reality. It was a challenging context to be working in. And yet that challenge also created a richness of disturbance to our conceptual and methodological working from which to creatively respond. The ordinary had been shaken up to such a degree by this unknown microbial non-human that we needed a new method of research. One question the team kept returning to was how to map out the new practices that were ever emerging in this new reality. Unlike the more familiar pathogens we had been thinking with in Mapping Microbes, the scientific understanding of SARS-CoV-2 was ever-evolving.

CV: Did this 'unnerving' and 'new' pandemic context mean that you developed a more experimental relationship to your creative practice as a performance artist and community research facilitator?

PH: There was certainly an unknownness that I and the team were encountering as the once familiar bus environment was rendered strange. Also, hospital infection prevention practices and behaviours we'd previously studied were starting to become more ordinary as people performed and experienced them on the bus.

It felt like there was an opportunity to do something different, but we couldn't be as artistically experimental as we might have been, in a less pressured window of time. Tens of thousands of people were dying and this intervention we were trying to make was attempting to seriously address the practices that gave people more susceptibility to contracting the virus, while also helping the country safely get back to more normal levels of social and economic activity.

CV: The starting point for the films was the challenge of representing the SARS-CoV-2 virus in ways that were scientifically sound but equally engaging and accessible. Elsewhere, Bioart has given form to microbes as part of enquiries into biological worlds (Kelley, 2016; Mitchell, 2015) and visualisations have supported pedagogic training among healthcare workers (Macduff et al., 2017). What seemed missing were social *behaviours* in response to microbes.

Looking at the films made (the reader can find them here: www.neveraloneonthebus.org/outputs/), what is striking is the absence of human characters. Instead, the bus architecture does the talking. Where did the idea of bus-architecture characters come from and what was their role in the films?

PH: Experimenting in more-than-human microbial methods was exciting, but also difficult. Part of that difficulty was ethical. When scriptwriting began in spring 2021, restrictions were being eased, the winter lockdown had ended, and face coverings were still advised in many indoor contexts. Older people and those with certain clinical vulnerabilities had been offered the vaccine. But there was beginning to be, as I remember it, more slippage in how guidance and regulations were being communicated and followed. Bus passengers recounted tensions around some people wearing or not wearing masks, some passengers wanting to open the windows while others wanted to close them because it was cold. A key parameter for the team was to not reinforce prejudices around who was performing certain behaviours judged as riskier or behaviours that intensified risks for others. We didn't want to be didactic or judgemental about these practices.

And so, the team asked, 'What *can* we do?' if we don't want to have human characters in the films, if it's not about something like one-upmanship: 'Oh, I'm wearing a mask'. That's quite a simplistic,

potentially problematic and stigmatising scenario to adopt, and attitudes towards mask-wearing were (and remain) fluid. Joe did some initial sketches around the bus itself being a character and Joe and I did some photographic and video experiments at the bus depot, with the bus doors being like the mouth and trying to think of the horizontal opening windows as eyelids. We explored thinking about the architecture of the bus as a character that helped us visualise different kinds of agents, including – drawing upon Haraway (2008) and Whatmore (2006) – non-human agents. The scenario of infection is often framed as being between humans (unwashed hands, coughs and sneezes, poor food preparation), but in this project the research team approached the 'event' of infection as being an encounter between humans, surfaces, air, the virus and other microbes. Each has agency and is actively entangled in the event of transmission or infection (drawing on geographers writing on relations and entanglements; Allen, 2012; Lorimer, 2010; Taylor and Pacini-Ketchabaw, 2018).

CV: Anthropomorphic characters such as cartoonish representations of 'germ monsters' are not uncommon in the visual language of public health. What did feel visually new was how the bus characters focused discussions towards *practices* onboard the bus like cleaning or ventilation that affect the atmosphere and environment of the bus. Making characters out of the bus architecture visually detracted responsibility away from the individual human and foregrounded relationality in an ever-evolving bus environment with other humans, non-humans and microbes. This was closer to the socio-technoscientific reality of entangled human relations with complex and diverse microbial communities, rather than a narrative of fixed and oppositional relations represented by the UK Government's (and various strategies taken by devolved nations) attempts to 'control the virus' or to fight a 'war against COVID' (Waylen, 2021: n.p.).

PH: Each of the films – *Fresh Air Shows You Care*, *Use Your Head to Stop the Spread*, *Leave Some Space Just in Case*, and *Keep Your Micro-Passengers to Yourself* – focused on a scenario that had been reported in our interviews, such as sitting next to someone who was coughing or somebody closing the bus window rather than opening it for ventilation. And that's when the bus characters came in – like Sammy STOP Button and Backseat

Bob – with supporting human characters who were largely off screen. Joe started writing the scripts and the research team went back and forth, redrafting and editing, via collaborative online documents. Through the bus characters, stories of human–non-human interactions were told.

CV: This is particularly evident in one of the films where a trio of grab handles became commentators for the off-screen action of a human walking down the stairs and sneezing (Figure 1.1).

PH: The viewer doesn't see the sneezing human character, but does see the interaction between these non-human characters; this gave a useful distance from the 'responsibilisation of individuals' in transmission of the virus and yet somehow also points to the collective responsibility of bus passengers. Aesthetically it links to a long history in animation – Disney's 1940 *Fantasia*, ITV's 1984 *Thomas the Tank Engine*, Pixar's 2008 *WALL-E* – of objects becoming animated characters, and with the animation style that uses a mixture of hand-drawn and stop motion mixed with live action. The more-than-human methodological approach innovated was driven by a desire to find a format that allowed us to not characterise, or stereotype, the identity of who may be inclined to follow, or not follow, infection prevention advice.
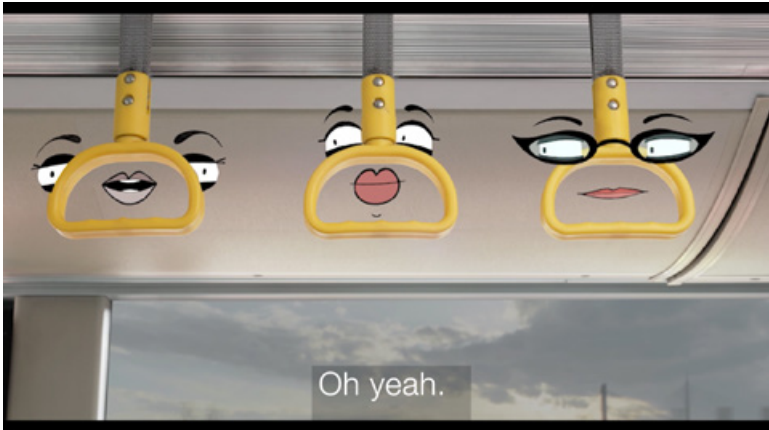
Figure 1.1 Still from *Use Your Head to Stop the Spread* (short video), part of the 'You're Never Alone on the Bus' series (© 2021 Joseph Turp and Routes to Safety. All rights reserved.)

Microbial aesthetics

CV: Thinking back to the visual cultures of the pandemic (see Lynteris, 2020: 190) and UK Government public health films especially, the decision *not* to focus on humans was, aesthetically speaking, substantially different. Co-producing four shorter films, however, echoed the stylistics that the various UK regional governments were working with.

PH: To make four shorter films was a practical choice, to do with distribution. If these films were to be shown (as they were) on social media, or on buses, then they needed to be short, because people's viewing concentration is much reduced on those platforms. And while these four films were 'of a piece', part of a series, they also each stood alone. Each has a different story that reinforces a collective message. For example, they certainly started off being very short words, punchy tag lines like 'Hands – Face – Space'.

CV: And there was a simple visual design – icons, simple text – and a limited colour palette like blue and white, connecting to NHS visual design.

PH: By 2021, the various UK goverments started to do longer pieces; some about air and meeting people indoors including one showing a cloud of particles spreading in a room where people were sitting.[1] I remember pandemic imagery featured representations of sticky yucky stuff (potential virus on surfaces), of neon clouds or ectoplasm (potential airborne virus) being spread about in a domestic environment. Such images were loaded with affect (unsettling, fear, disgust, etc.) that leveraged emotional reactions conducive to coercing individuals into adopting 'responsible' behaviours through the 'yuk' factor (see Allen, 2021). These were the dominant representations of the virus circulating in the world.

CV: Finding new tools and techniques to communicate non-human worlds that affirm their agency without provoking fear and disgust seems like an important step for addressing the lacuna of microbial literacy among non-specialist publics.

PH: In the films in the series, 'Never Alone on the Bus', there's something more light-hearted and immediately kind of playful. A couple of participants said that there's something child-like about the films; like a *Thomas the Tank Engine* world where bits of the bus talk to each other. Perhaps animating the non-human in that

way, making that imaginative leap to give the non-human a character, creates a frivolousness or playfulness to it, that was understandably absent from government communications. We would see humans talking, a minister sharing stark messages, and very naturalistic home environments with humans acting in a naturalistic manner with a spooky invisible layer of infection present. Because our team doesn't work for a public health body, we had licence to try to engage people in a different way.

CV: This microbial imaginary equally rejects images of microscopy or anthropomorphic representations of microbial 'monsters' that have historically been mobilised. These, of course, can be helpful, but also affectively alienating and can misinform people about microbial behaviour and how this connects to practices of infection prevention. Can you say something more about the microbial non-human and the practicalities of working on this with Joe?

PH: Alongside animating bus architecture, a key parameter for the films was to visualise the microbial community of the bus, which is both viral and bacterial. The research team's microbiome study (as yet unpublished) evidenced that the types of microbes on the bus are mostly environmental and are not a risk to human health. Nevertheless, these are the microbial things that we are often scared of interacting with because we can't see them. This invisibility felt important. A challenge of the project was that the world, for many, changed radically because of new knowledge of the presence of a non-human agent – SARS-CoV-2. Unless we're microbiologists with a specialised electron microscope and access to the virus we can't see it. Most of us don't really understand what 'it' is or its viral character. This is a real societal challenge. How do we communicate something that people can't understand or get to know using their conventional sensory and talk-based approaches? Yet onboard the bus, people were doing all sorts of things to adapt their practices to the 'unknowable' virus.

CV: The once familiar space was rendered uncanny or distorted – by face masks, signage about where to sit, practices of physical distancing. People's everyday experience of the bus travelling space was altered by an unseen, but sensed, microbial world. For many bus users interviewed, this produced intense feelings of uncertainty that shaped interactions with other passengers, the bus architecture and the possibly present virus.

PH: The team wanted to work with findings from interviews, where passengers, drivers and cleaners were asked how they imagined the virus and how they thought they might catch it. People talked about what they thought the virus wanted, like 'it wants to survive', or 'it wants to infect people'. People were giving the virus agency. Incorporating this in the films in a way that wasn't alarmist was imperative, because one of the research aims was to inspire confidence on the bus. If people are carrying out infection prevention practices, the bus *is* a safe place. If they're not, then that becomes harder to say. We didn't want to reinforce government messaging that was targeting public transport as more risky than other indoor environments.

I remember Sandra Wilks, the microbiologist on the research team, has talked about adverts for domestic cleaning products where you have little 'germ monsters' trying to jump out of toilets, or by contrast adverts for food products that contain 'healthy bacteria' for the gut, visualised by a warm glow. Representing the virus as an individual, whether monster or protector, sat uncomfortably with the more-than-human methodology the research team was developing.

CV: In three of the films, the microbial is hinted at (coughs, sneeze), but it's the fourth – *Keep Your Micro-Passengers to Yourself* – where microbial representations begin to be untethered from this unhelpful good-bug bad-bug dichotomy. Could you explain how you worked aesthetically with the microbial in this film?

PH: A recurring theme of discussion was how to represent *communities* of microbes as biofilms on surfaces or as a combination of different bacteria and viruses and whatever else in the air. This was approached through a visual animation that was layered onto the film afterwards. It was a glittery glow that was around various bus surfaces. And these were also characters.

Lines were introduced into the script about what we called 'micro-pets' or 'micro-passengers' – to point to the invisible microbial communities that live in or on us. The non-human bus characters, like Sammy STOP Button, drawn by our character designer Adriana Meirelles, were aware of the microbial communities living on them. Some characters were happy about those communities and others were less so, which was reflective of human feelings about microbes. This is despite only a small proportion of

the microbes in and around us being pathogenic, as our (unpublished) microbiome study results showed. But it was very difficult to bring these perspectives into the film. The fourth film is the one that tries to do that, and that was certainly the one that proved most difficult to write. It was also the film that met a certain amount of resistance from bus industry stakeholders. Bus passengers seemed warmer to it. They got it. But I think bus operators were concerned that this film portrayed buses in a bad light, reinforcing the stigma attached to them as 'dirty' and full of bacteria, which is a story they wanted to avoid. More-than-human methods can provoke thinking on microbial agency, but there are clearly ethical and political considerations when working with various stakeholders.

Politics of microbial aesthetics

CV: Could you say more about the wider politics of microbial aesthetics?

PH: The films were shot as a series of fixed camera shots of the bus interior, which was brightly lit. The bus company that hosted the filming was keen that we used the new buses. These were very smart and colourful. It's quite clean and bright. Different parts of the architecture, like the seats, STOP button and grab handles, were filmed and then had hand-drawn animation layered on in post-production; for instance, drawn eyes or a mouth which were animated over the live action video. The live action video bits were made up of actors drawn from the research team and research participants who had volunteered to sit in the background to give a sense of movement around the animated characters.

CV: The videos were quite cheery in their aesthetic. Exchanges between the bus architecture characters were conversational and chatty.

PH: This evoked the conviviality that many bus passengers valued but noted was lost during the pandemic. A range of voices was selected for the STOP button, the seat, etc.: different genders and ages, different ethnicities, different regional accents, again reflecting a diverse bus passenger and driver community.

CV: This diversity, from memory, was a response to wider literature that celebrated the bus as a multicultural space – of exchanges

between unacquainted others (see Jensen, 2009; Wilson, 2011) – challenging the narrative of violence and racism on board or the social-spatial inequalities associated with these networks. And yet, interviewees affirmed the social and economic factors that were placing some bodies at greater risk of exposure to COVID-19; buses were a vital resource, transporting key workers to work, and our BAME interviewees to shops and health appointments.

PH: The routes we selected in which to conduct our ethnography also crosscut diverse neighbourhoods to acknowledge these social geographies.

When it came to the animated micro-passengers – an almost glittery sparkly twinkle – we wanted them to have a positive bright affectation, rather than a slimy feeling. It was something lively. It's about giving a sense that there are these communities and these worlds, that we can't see, that exist everywhere, including on the bus, but that's okay.

CV: Were there any concerns around anthropomorphising characters?

PH: The decision was made early on to make parts of the bus architecture characters rather than the microbes. Sammy STOP Button and Backseat Bob were intentionally anthropomorphised. We gave the bus architecture names and characters, knowing that people generally don't think of those things as having characters. Whereas people do think of a virus having a character – a character that was often framed in government messaging as a military adversary. Not anthropomorphising the virus troubles an individualisation of the virus as a monster, a singular 'thing'. That doesn't make sense in microbiological terms nor in how we might think of these communities of microbes and the way they interact with our own microbiome. Using the bus architecture as characters helped to give the film these stories. I am not sure if we did cute-ify them, but they remind me of *Creature Comforts*, an early Aardman Animations film (1989). Using those bits of architecture to tell the story of the human interaction with the microbial felt like a useful device to engage viewers in a story rather than just in an informational message.

CV: There was also something about how the bus characters became observers capable of reflecting on both worlds; the spectator and performer.

PH: In Greek tragedy, you'd have the chorus, or in Shakespearean theatre the narrator, who has greater knowledge of the drama on stage than the characters do. The narrator knows more about what's just happened or what's about to happen. They have this privileged position. I wonder if there's something in how the bus architecture is given a privileged position of knowledge because it can see what humans can't see, and in some of the films, the micro-pets.

Scriptwriting

CV: Creating public health resources that support confidence in public transport usage was a key aim of the project. What audiences did you trial the films with?

PH: Much of the social science field work involved interviewing bus drivers, bus cleaners and bus users. We chose to interview bus users solely from Bristol's Somali community, prompted by a condition of funding that at least 50 per centof participants originate from BAME groups, and by learning about the disproportionate impact of the pandemic on that community (Sayaqle, 2020). Some interviewees spoke of the challenge of UK Government pandemic communication materials being unavailable in different languages. Producing something that was accessible and that could be subtitled in different languages informed the creative process. The aesthetic was also oriented towards that – to try to be engaging and playful, rather than being reliant on linguistic understanding as the primary communicator. The team hoped the characters would be entertaining and relatable to different audiences. I'm not sure how effective that was because we haven't yet had them translated and subtitled in different languages.

Each of the films ended with a short slogan that relates to what's happened in the film. One film is about two bus seats talking about where passengers sit. At the end of the dialogue, they say, 'give some space, just in case'. This then comes up as a title. Again, when we screened the films with multilingual audiences of different ages, the feedback was that the narratives were engaging and the slogans were memorable.

CV: It feels timely to be exploring how more-than-human methods might support microbial literacy, but doing so in ways that

are sensitive to the differentiated social and cultural understandings of the microbial, cleanliness, dirt and 'other'. Continuing the theme of cultural reference points, could you say more about the use of analogies and of creating personalities behind each character?

PH: In the film, *Use Your Head to Stop the Spread*, three dangling grab handles are talking about humans walking down the stairs, whether one of them is wearing a mask or not. The research team with Joe tried different versions of that script and kept coming up against this thing that we didn't want to do, of being judgemental about mask wearing. It was around the time of the European Football Cup and the project lead, Emma Roe, suggested running with football as a frame for the film. The dialogue between the handles became a sports commentary on human behaviour – of whether the person was going to catch their sneeze; they spot someone with a mask and that's one point. It has this sense of a sporting analogy, but also reminds me of games you play with children, of spotting things outside the window, of counting red cars to keep a child quiet on a long journey.

CV: Developing appropriate and relatable characters was arguably more important when it came to breath and breathing as with the film *Fresh Air Shows You Care*.

PH: Scientific research was increasingly emphasising the importance of fresh air, which got us thinking; okay, how do we communicate about breath and keeping windows open? Central to our thinking about indoor spaces was needing to breathe and so this character became a calming yoga-teacher-type voice that was talking about breathing clean air in. It was a shift away from a didactic or alarmist tone: 'You must keep the windows open'. Our yoga teacher, with a lovely calming positive voice, was able to say that it's good to breathe and it's good to have fresh air.

CV: None of the team are scriptwriters, including Joe – who's in the field of cinematography – and my academic and artistic background is in dance. How did the process of writing work?

PH: The research team used a shared online document for the scripts and sometimes we worked offline and sometimes we collectively edited it 'live'. It was a useful lesson to try to boil down these complex ideas, during a dynamic time when guidance was evershifting and when rules differed geographically according to political borders, into something that was a real kernel, in an exchange

that wasn't heavy-handed. It wasn't about being didactic, but it did have a sort of educational function.

Collaborating on the script felt like a useful process in pushing the team's conceptual and methodological thinking. How do we do more-than-human research and communicate interspecies related-ness through film? How can that process of scriptwriting enrich and enliven practices of engaging other publics whether through policy reports (Roe et al., 2021) or through stakeholder workshops? There was something valuable in being able to consolidate these ideas into exchanges of short, simple sentences and dialogues. Other than the statements at the end of each film, which were in the 'official' authorial voice of the researchers, the rest of the dialogue came through exchanges between the characters.

CV: There were multiple non-human voices that were manifesting or conjuring some of the issues that we were looking at. It's interesting how removing a word or a sentence transformed the flow and meaning of a particular socio-microbiological issue, practice or relationship.

PH: The team were thinking about spoken text, in different voices, and so intonation and how we structure those sentences were also something we had to learn about. The scripts were sent to voice-over artists under Joe's direction, and we found they interpreted the meaning of the words slightly differently. Some words were changed because of the voiceover artist's natural way of speaking. Everyone has a different rhythm or cadence. Our words didn't quite fit in their mouths. During writing sessions, the team read them out loud, which felt quite strange, but it was necessary to get to know that material in a very intimate way. And it drew us out of formal modes of writing for academic or report-reading audiences, and towards experimenting with more accessible and engaging materials for com-municating interspecies relations.

CV: Scriptwriting opened up avenues for the research team to apply dramatic writing techniques (scene heading, structure, pause, rhythm, intonation, dialogues) to co-produce knowledge (with non-human bus characters and micro-pets) about public health and disseminate information in visually appealing and affectively generative ways. Such devices have critical and creative force to engage audiences on a different level (to public health and scientific

pedagogy) that is playful and imaginative, and which affirms the contingencies at play in the act of preventing infection.

Conclusion: for more-than-human microbial methods?

CV: The pandemic has been a profound testament to the multispecies worlds that we live in, and what exceeds human control and representation. Acknowledging the vitality, materiality and dynamism of more-than-human worlds – of microbes demonstrating agency that shapes human behaviour and practices – demands that scholars do research differently. To follow Dowling et al. (2017: 823), there is a lacuna of knowledge in how 'to engage, to embody, to image and imagine, to witness, to sense, to analyse – across, through, with, and as, more-than-humans'. Looking forward, where do you see the conceptual and creative methodological developments in contributing to this gap in doing interspecies research and communication?

PH: The first is around interdisciplinarity and the specific constellation of knowledges and practices that came together for this project. There is growing work examining more-than-human methods, but there is still less methodological innovation on social and cultural approaches to studying the microbial, with some exceptions (Lorimer et al., 2019). There is a pressing need to develop both methods and ways of thinking that combine socio-scientific with microbiological worlds to make knowable microbial communities and their behaviours – what's happening on surfaces and how their presence (or imagined presence) shapes interactions between human practices. Routes to Safety is a small step towards addressing this knowledge gap.

CV: Interdisciplinarity is, of course, not new in research. Routes to Safety amalgamated knowledges and practices from microbiology, geography, landscape architecture and performance art, and methods spanning scientific, social and creative techniques – including swabbing, interviews, ethnography and filmmaking. None of these methods were innovative in and of themselves but what was valuable in the context of the pandemic was the mutually informative process. Passenger concerns about where the virus might be

located informed where swabbing took place, and decisions to swab particular surfaces informed the team's onboard observations as passengers touched or avoided surfaces.

PH: The more-than-human microbial methodology offers ways of thinking about bridging the gap between microbiological processes and social anxieties and practices around the imagined world shaping the actions of microbes. And I'm folding the film-making process in here too. While Joe didn't participate in the other research activities, he was involved in the interdisciplinary thinking-through-reflecting-and-talking sessions that were mutually inform-ative and productive. These creative conversations helped iterate the content of the films and fed into the team's interdisciplinary grappling around many of the broader research aims and objectives.

CV: Part of that interdisciplinary more-than-human microbial contribution seems to be around activating other, more-than-repre-sentational, frames of knowing.

PH: This brings me to my second point. I think what the team has done is quite ambitious but also vital in terms of engaging – or helping to understand *how* to engage – people with the socio-ecological dimensions of contemporary life or the challenges of the contemporary moment. And especially people from multi-cultural backgrounds where linguistic considerations need to be enveloped into the methodological process and dissemination practices. Creative filmmaking and scriptwriting solicited playful aesthetics, the affective, the emotional, the imaginary –qualities that interviewees identified as driving infection prevention decision-making. The impetus for these forces weren't always rational or grounded in microbiological 'evidence', but did matter to the rationale and reasoning that drove decisions about when and how to travel, what practices and behaviours to adopt and how to nego-tiate risk and anxiety in the context of indoor spaces like the bus.

CV: More analysis is needed to determine how 'successful' the films were in building microbial literacy, but what they possibly offered was a different way of knowing and encountering the non-human – one that wasn't alarmist but conversational, playful.

PH: Storytelling (and other animation tools) by our non-human characters, with diverse accents and voices, disrupted traditionally dominant voices in public health films. And they also narrated more-than-human relationships involved in the process of infecting, which from my perspective asks us to think further about how we live

alongside others. My creative approach was driven by a need to think differently about how bodies are interacting within the bus, as well as the interactions of human and non-human bodies (like viruses). The films offer ways for imagining and facilitating a space in which new knowledges can be made. Creative methods are one of the tools to be drawn on to respond to this pandemic and inevitable future health challenges because they enable a different perspective on our relationship to the world, especially human–non-human worlds.

Coda

Human–microbial relations have come under international attention, not only in political and policy settings but also in everyday spaces and within ordinary lives, in response to a range of microbial crises. There is a pressing need to develop concepts that afford greater socio-microbial knowledges, and novel methods for studying the more-than-human, in ways that account for worlds where humans are not the sole force of change. In response, this chapter has applied post-humanist thinking and interspecies discourse to tell novel stories of infection prevention for multispecies living. It thought through the innovation of a creative more-than-human microbial method, in the form of four animated films, capable of supporting sense-making of the microbial and building microbial literacy in the context of infection prevention and protection in shared indoor spaces. In contrast to medico-scientific representations, the films worked against and beyond other textual forms of knowledge, communicating through forces that included aesthetics, affect, emotion, the imaginative and more-than-human storytelling that was playful and humorous. There is great potential for methodologies like this, not only in the field of infection prevention and communication, but in associated public health work in pandemics like COVID-19, in 'wicked problems' like antimicrobial resistance, and in socio-ecological crises both current and unknown.

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Note

1 See www.youtube.com/watch?v=qYZMOG2kUWg

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