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Contagion Went Viral: Microbiology, Entertainment Media and the Public Understanding of Science

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Abstract

Purpose of Review (research questions) How has the COVID-19 pandemic influenced how movies are used in public health crises? What made *Contagion* (2011) the key example? Why is it important for scientists to understand the role of entertainment media in public understanding of science (PUS)?

Recent Findings Microbiology on the Hollywood screen—and in particular, the way we talk about pandemics—has changed since COVID-19 hit. Imagined futures of the end of humanity have taken on a renewed relevance. The pandemic has inspired writers across a number of science/medical humanities fields to explore PUS and public pandemic preparedness.

Summary Microbiology movies like *Contagion* became valuable sources of distraction and information. Their apparent accuracy and authenticity were *because* of the scientists. *Contagion* caught the public’s imagination because of its investment in representing the realities of science that offered a pathway *through* the pandemic instead of another dead (at the) end dystopian disaster.

Keywords Microbiology · Science communication · Public health · Science entertainment · Public understanding of science · Pandemic · *Contagion* (movie)

Introduction

When the first wave of lockdowns fell across the West in March 2020, the viewing figures for *Contagion* (Soderburgh, 2011) rose substantially. Searches, according to Google trends, rose dramatically in January 2020 and then again in March 2020, when the search terms “contagion movie” peaked in popularity [50]. Such was the increased interest in this film that its stars made public service announcement (PSA) videos with activist digital media producers Participant Media, science advisors from the original movie, and public health experts at Columbia Public Health at Columbia University as part of their ‘Control the Contagion’ campaign [32]. *Contagion* offers ‘an impressive level of detail on pandemic science and policy’ ([35]: 2) and remains a key film in discussions of the importance of science advisors in Hollywood cinema [25•, 27]. Thus, the film became ‘a sort of “how to” guide in the event of a

catastrophe in their vicinity. Or at least a “what to”—what to expect when you’re expecting an epidemic’ [18]. For socially isolating audiences looking for advice and even comfort, this almost 10-year-old film offered a fully realised world where viewers could watch and almost walk through the procedures and ethics of private as well as public health infrastructure decisions.

Contagion offered much-needed optimism that a vaccine could be synthesised, and that humanity led by its scientists and the vital work of public health workers and policies would successfully manage the virus. The film offered an alternative prospective future from earlier films like *28 Days Later* (Boyle, 2002) and the more recent additions to the *Planet of the Apes* franchise that imagine the world after the decimation of humanity with little hope of recovery. Although often in the minority in science fiction media, hopeful narratives that show that science and public policy can control pandemics appeal to and are used by the public to navigate their own experiences and expectations of living through a major disease outbreak. As COVID-19 emerged as a global crisis, *Contagion* resurfaced as a key text rising above the abundant dystopias to offer a positive framework for how to manage a pandemic at a time of great uncertainty.

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The ways in which science, scientists' expertise and practice and public health policy are communicated through entertainment media should be of great interest to the readers of *CCMR*. Public understanding and acceptance of scientific advice and progress are intrinsically linked to the politics, politicians and policies that fund, regulate, and surveil the sciences [37]. Entertainment media is a significant vehicle for public understanding of science that has been shown to complement (and contradict) public health policies and guidelines. Publics are often 'over-saturated by competing compelling perspectives where science is confronted by well-communicated (if inaccurate) opinion' [6]: 6). But as the paratextual narratives created around *Contagion* by Columbia Public Health show, collaborations between entertainment media stars and science communication experts can offer routes to communicating valuable public health advice using existing movies and their popular culture power. *Contagion* caught the public's imagination because of its commitment to representing the realities of science that offered a pathway *through* the pandemic instead of another dead (at the) end dystopian disaster.

In a commentary piece for *Microbiology Today*, I facetiously opened my discussion with a misquote of T.S. Eliot's 'The Hollow Men' (1925) saying: 'This is the way the world ends. Not with a bang but *a virus*' [8]: 191). I wrote about contemporary virus films, from 1995's *Outbreak* (Petersen, 1995) and *12 Monkeys* (Gilliam, 1995) to 2011's *Contagion* and *Rise of the Planet of the Apes* (Wyatt, 2011). Little did I know that a few years later we would be living through a global pandemic. This review paper looks at several fictional representations of pandemics and how their aftermaths have been shown and considers the impact this has had upon public perceptions and understandings of virology. Alongside *Contagion*, I will look at *Outbreak*, pandemic-themed games, and the most recent *Planet of the Apes* franchise reboot that began with *Rise of the Planet of the Apes* and goes on to include *Dawn of the Planet of the Apes* (Reeves, 2014), *War for the Planet of the Apes* (Reeves, 2017), and the forthcoming *Kingdom of the Planet of the Apes* due to be directed by Wes Ball (*Maze Runner* franchise, 2014, 2015, 2018) and slated for release in 2024. This revisioning of the *Planet of the Apes* myth shifts the catalyst for a post-human, ape-dominant Earth from nuclear apocalypse as it was in the original adaptation and later sequels [9], to a world ravaged by a laboratory-produced pathogen that mutated from an experimental cure for Alzheimer's. This shift in a franchise that spans over half a century (since the Charlton Heston-starring *Planet of the Apes* [Schaffner, 1968]) is indicative of broader trends in science fiction media concerning the way that science and public expectations for and understandings of that

science influence and are incorporated into to moving image media. Since the science fictions of the late 1960s, the end of humanity has often been imagined as human-made and often technology-driven (nuclear apocalypse) or compounded or caused by human negligence and/or apathy (climate crisis). But there is now a viral turn in science fiction media that shows the cultural shift in our understanding of how the human world may end, an approach that aligns with Eliot's prophecy of a world-ending whimper (well, a viral-loaded cough) rather than a cataclysmic bang.

The imagery of the pandemic felt/feels eerily familiar, but this may be perhaps because for many in the West their only direct exposure to the visual cultures of pandemics—prior to COVID-19—came predominantly through the media. And public health experts know this. Epidemiological diagrams, medical artists' renderings of the virus, and PSAs have appeared in and became central to the worlds of fictional diseases in films such as *Rise of the Planet of the Apes* and *Dawn of the Planet of the Apes*. Despite the obvious restrictions on the filmmaking industries during the height of the pandemic, there were new releases like *Songbird* [33] that imagined the mutation of the virus in near future New York 2024. The film extrapolates horror from the worst fears of the lockdowns and the impact of mismanaged public health advice and restrictions. As director Adam Mason [33] explains 'the script (was written)] in 3 days and became the first movie to shoot in LA during lockdown'; it was pitched in March 2020, greenlit in May, shot in July, and released in December 2020. *Songbird* was reviewed as a 'technical triumph' that acts as 'a fascinating historical document of how some creatives found their way around the rules during an impossible time' [29]: online), but also one that might be understood as dubiously 'exploitative filmmaking' that is unlikely to 'be of any interest after this protracted national (US) nightmare is over' [46]: online). Microbiology on the Hollywood screen—and in particular the way we talk about pandemics—has changed since the COVID-19 pandemic hit.



Mid-end-credit sequence from *Rise of the Planet of the Apes* showing the rapid spread of the Simian flu

Popular in a Pandemic: Microbiology Media

Although there is a long history of plague narratives in literature dating back to classical antiquity, it was following Mary Shelley's *Frankenstein* (1818) that science fiction emerged as a mode for exploring the relationship between science and society. Shelley was a pioneer of scientific fiction that understood science 'as an intensely practical activity inextricably productive of new technologies' rather than a fantastical genre (34: 9). *The Last Man* (1826) was her second science fictional novel, and it was set in the late twentyfirst century as a plague razed the Earth and devastated humanity with a near-extinction event. In this novel, Shelley approached science from an almost opposite stance than she had in *Frankenstein*. Where *Frankenstein* critiqued scientists for over-confidently playing God, *The Last Man* lambasted medical science for doing too little too late. Now recognised as the mother of modern science fiction, Shelley's science fictional imagination was reviewed by her peers as evidence of a 'diseased' mind that offered morbid 'lecture in anatomy' rather than literary entertainment [2]: 335). Imagined futures of the end of humanity due to an infectious outbreak are not new, indeed they are foundational, but take on a renewed relevance in the ongoing pandemic where popular culture became not only a valuable source of distraction but also information. They offer fictional scenarios that can 'contextualise public and governmental responses' and site for potentially 'educating the public about unfamiliar concepts like 'social distancing' and 'R0' ([25•]: 90–91).

The widespread access to digital viewing platforms, a growing market for video-on-demand productions (that Songbird responded to), and the wide use of social media platforms offered numerous entry points to communicate with broad publics about pandemics using familiar, publicly accessible language and imagery.

Outbreak and *Contagion* have both seen rises in viewing figures during actual epidemiological crises. *Outbreak* is a medical disaster film based on an article in *The New Yorker* and a later book by Richard about the first isolation of Ebola virus in the US, the outbreak came from imported primates in Reston, Virginia in 1989 [5]. *Outbreak* is about an Ebola-like virus that breaks out in Zaire and then a small Californian town due to the import of an infected monkey. The film speculates on how local, national, and global institutions would respond to such a threat. *Outbreak* was released in March 1995 just a few months before a new outbreak of the virus occurred in Zaire [4]. *Contagion* is set in a fictional global pandemic of the Meningoencephalitic virus/MEV-1

that is modelled on the bat-borne Nipah virus (NiV) that was identified in 1999 after killing around 100 people in Malaysia [30]: online). *Contagion*'s release coincided with a CDC campaign in 2011 that used the popularity of zombie and deadly infection narrative 'phenomenon' across film, TV, and gaming to garner 'publicity for disaster preparedness' [3]: 41). *Contagion* and *Outbreak* 'capture a postmillennial structure of feeling, including the fear and helplessness that accompanies the paralysis of risk-managing institutions' (ibid: 41). In this context, risk aesthetics can be defined as the visual and linguistic rhetoric that communicates what *might* happen in an emergency as established via media representations of anthropogenic and natural disasters including pandemics. The power of and public familiarity with the 'aesthetics of risk' popularised through and embedded into popular fiction, influence how real-world disasters have been reported and understood [3]: 41). The popularity of contagion narratives perhaps also helped to manage expectations during the early stages of COVID-19, thus avoiding 'magical thinking' [13]: online) and the belief that the pandemic would suddenly just end and that institutions would be able to seamlessly manage the situation and rapidly develop a vaccine. *Contagion* offered a walk-through of a global pandemic that speculated upon where world leaders and leading institutions might struggle but offered also 'comfort' and hope that a vaccine could be found [23]: online). The interest in *Contagion* peaked 8 months *prior* to the rollout of the first vaccination programmes, and the speculative fiction of the movie allowed people, as Kevin S. Moore ([35]: 2) argues 'to recognise and process reality' in a time of great uncertainty.

Uncertainty became a recurrent experience for Western audiences accustomed to pandemics being part of a distant land or distant past. Viruses that could reach pandemic levels were considered the purview of Asia; this had been established as an accepted view that was underpinned by and perpetuated through the idea that uncontrollable diseases only happened to the foreign Other [14]. This racialising of pandemics led to 'many individuals of East or Southeast Asian descent' being 'lumped together as "Chinese" and shunned as contagious 'suspicious bio-political subjects' [10]: 629, [16]: 472). The threat of contagion has often given 'rise to discrimination and scapegoating "others"' but since the COVID-19 infections began in 2019 'anti-Asian discrimination has been on the rise' ([39]: 2,5). Compounded by the fact that the 'leader of the free world' President Trump tried to give the pandemic the colloquialism 'kung flu' [28]. The anti-Asian sentiment that has been part of the COVID-19 reporting and responses to the pandemic was

not anticipated in the mildly utopian playing out of the virus in *Contagion*.

‘Viral science fiction’ became a ‘primary locus for speculation about COVID-19’ [34]: 8). Fictional versions of pandemics often follow a similar pattern that Priscilla Wald ([52•]: 2) identifies as having three stages: “the identification of an emerging infection”, the global spread of the identified contagion; and finally the “epidemiological work” that often results in its containment. *Contagion* maintains an almost utopian ‘solution-driven competence’ that results in an eventual return to normal [36]: online), but the reality of failures in international collaboration are still explored in the film. It highlights the impact that our increasingly ‘globalised and technologized network society’ has upon the rapid spread of contagions including unrestricted international travel and the unsustainable consumption systems that cause sudden shortages and public panic [47]:17). Many of the US/Hollywood narratives I refer to in this article focus on the rapid collapse of infrastructure in the West, we are increasingly interconnected and global but to manage global threats like this and the ongoing climate crisis countries *must* work together and ‘transcend the old binaries’ that centred the scientific knowledge and thus the solution firmly with ‘heroic epidemiologists and other medical professionals in the Global North (who draw on their expertise and the technologies of scientific medicine to save the species’ [30]: online,[52•]: xv). The seemingly prophetic nature of *Contagion*, *Outbreak* and other popular pandemic plotlines offered some comfort and certainty. But their apparent accuracy and authenticity was *because* of the scientists – the labcoats in Hollywood [27] – involved in advising on and developing the narratives of contemporary science-based fictions. Understanding the connection between science and popular culture has become increasingly important and relevant as COVID-19 becomes part of the everyday to be *lived with* rather than played out.

Contagion and *Outbreak* rocketed up watch lists during the COVID-19 lockdowns of the 2020s, but texts on other media platforms have also gained pandemic popularity. For example, during the H1N1 influenza virus pandemic of 2009 (commonly referred to as “swine flu”), the Flash game *Pandemic 2* (Dark Realm Studios, 2008) grew in popularity [48]. Then during the early epidemic phase of COVID-19, *Pandemic*’s rival/descendant *Plague Inc.* (Ndemic Creations, 2012) became the number one selling game on the Apple App Store in China and later in places like the UK and the US ([20]: online). As an Ndemic Creations spokesperson explained in November 2020:

Plague Inc. has been out for eight years now and whenever there is an outbreak of disease we see an

increase in players, as people seek to find out more about how diseases spread and to understand the complexities of viral outbreaks... We specifically designed the game to be realistic and informative while not sensationalising serious real-world issues (ibid).

The game creators had already partnered with British charity Full Fact for an expansion to the scenarios menu to include a ‘Fake News’ mode. Released in December 2019, this option allowed users to infect the world not only with an epidemic but also misinformation [49]. Although initially intended to coincide with the 2019 British parliamentary election in the wake of the US ‘fake news election’ and the rise of populist Donald Trump [44]: 140), the game expansion became part of the popular culture surrounding the pandemic where fake news mutated into a ‘deadly infodemic’ [19]. The game has been host to a variety of extensions that link *Plague Inc* to fictional pathogens including the Simian Flu in 2014 as marketing for the sequel *Dawn of the Planet of the Apes* where users play as both the virus and the ape with ‘pursuing independent but complementary objectives: escape from, and destruction of, humanity’ ([49]: 240–241). Media products from film and TV to apps and games have been recognised as sites where public understanding of COVID-19 and pandemic responses were developed and consolidated.



Pandemic 2 (2008) ‘character’ selection screen

The value of *Plague Inc.* as a form of science communication was discussed in a post on the Centers for Disease Control and Prevention’s (CDC) *Public Health Matters Blog* [24] about the app game, which explained that from a CDC perspective *Plague Inc.*

uses a non-traditional route to raise public awareness on epidemiology, disease transmission, and diseases/pandemic information. The game creates a compelling

world that engages the public on serious public health topics.

Game users interact with scenarios and take on a role akin to public health policymakers—although ‘winning’ the game involves wiping out the human population, the processes by which contagion spreads draw upon real medical scenarios and advice. As Marius Hans Raab, Niklas Alexander Döbler, and Claus-Christian Carbon ([43•]: 4) show in their article on the ludification of the pandemic, games like *Plague Inc.* and *Pandemic 2* parallel and perhaps even inspired the statistical and visual communication style that would become part of the real COVID-19 monitoring dashboards. Visual parallels are unavoidable between dashboards for the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University and the mapping and monitoring of contagions presented in storyworlds like *Plague Inc.* Infection counters, R-value and growth rate statistics, daily death tolls, and global rankings are a familiar sight in fiction and gameplay, and with ‘the absence of established societal standards for dealing with a pandemic in North America and Europe, rather generic established patterns—game elements—(were) applied to make sense of the very real and dangerous threat’ [43•]: 4–5). When major international Anglo-American broadcasters like the BBC and CNN used live trackers that were present on screen regardless of the news item being reported, viewers could check in on the ‘score’ and progress of the pandemic in a way that framed humans as losing the game against the contagion (Ibid).

Spreading Facts, Not Fear(?): Fiction Meets Fact on Digital Platforms

Fictional contagion campaigns influenced and, in some cases, even merged with the visual culture of the COVID-19 messaging. Mis/information about the virus could quickly go viral with people sharing memes and doctored images at a speed that fact-checkers neither anticipated nor managed [15]. ‘Sociocultural visuals’ like memes, gifs, cartoons, and webcomics were shared to ‘authenticate, personalise, and express our fears, anxieties, and hopes’ but were ‘not necessarily negative but (functioned) productively in creating a unity of vision and collective understanding’ [45]: 138, 152). A series of PSA videos published in both English and Spanish translation via the Columbia Public Health YouTube channel in March 2020 featuring stars from the film *Contagion* were widely accessed and shared. The actors were used to communicate public health messages about social distancing, sanitation, and scientific expertise;

using the hashtags #StayHome #WithUs they encouraged people to begin the process of locking down North America and by extension, Western Europe as Kate Winslet explained: ‘the health of our society is in your hands’ [11]. As explained on the *Control the Contagion* website:

misleading, inaccurate messages and advice about the COVID-19 pandemic are being shared across both traditional and social media platforms. We wanted to do our part to curb this [12].

Hosted by Columbia University’s Mailman School of Public Health the campaign involved ‘the same experts who worked on the film’ including W. Ian Lipkin, Larry Brilliant, Laurie Garrett, and Mark Smolinski, with the addition of Stephen Morse. Just as the original film had done, this approach to public health ‘raised awareness of emerging infectious diseases far more than any popular science book ever could’ [26•]: 19). The purposeful merging of fact and fiction for ‘spreading facts, not fear’ used several communication strategies to ensure that the most important ideas about the impact of individual actions were transmitted virally online [31].

These widely accessed videos published on YouTube as well as via Twitter and Facebook provided key scientific advice delivered by recognisable (for the target Western audiences) actors whose characters had shown that there was hope of, and necessary personal and public action for surviving such a pandemic. Notably, *Contagion*’s patient zero played by Gwyneth Paltrow was not included in this public health campaign, perhaps due to the fear her character’s fate might engender. Similarly, Jude Law is also absent from these intentionally reassuring PSAs; Law played the conspiracy theorist Alan Krumwiede whose viral blogging spread misinformation including endorsing unproven treatments like Forsythia that foreshadowed President Trump’s own promotion of substances including hydroxychloroquine and azithromycin as effective COVID-19 therapies that directly affected public opinions and behaviours [40]. Winslet, Lawrence Fishburn, Jennifer Ehle, Matt Damon, and Marion Cotillard all refer to their characters’ importance and positive actions that Paltrow and Law could not have contributed to. The direct-to-camera address that was filmed non-professionally using camera phones and personal computers by the actors became standard practice during the pandemic, but at this early stage it makes the videos feel more immediate and urgent even though it was a necessary technique rather than an intentional aesthetic choice. Background images of people’s homes became part of the fabric of the representation of scientific expertise as scientists beamed their advice and analysis directly into newsrooms from their living rooms and attic offices.



Kate Winslet giving advice on handwashing in the Columbia Public Health video ‘#Stayhome #withme and Control the Contagion: Spreading Facts, Not Fear’. (28 March 2020a).

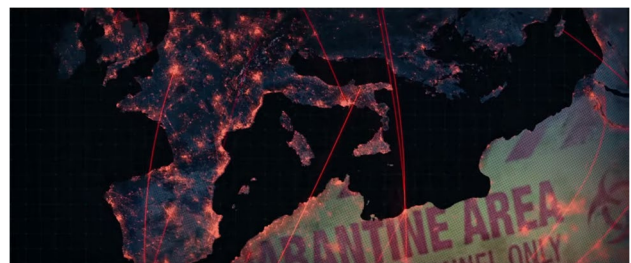


Columbia Health videos featuring *Contagion* actors (clockwise from top left): ‘Matt Damon says listen to COVID-19 experts’; ‘Jennifer Ehle on COVID-19 vaccine’; ‘Lawrence Fishburn on how to stop the spread of COVID-19’; Marion Cotillard on the choice we all have to make’.

Where *Contagion* prophetically presents the process of spreading disease from bats and wet markets in China to disrupting the lives of people across the globe, *Dawn of the Planet of the Apes*, followed by *War for the Planet of the Apes*, only offers the aftermath; the data visualisation of the international pandemic response is almost all that is left after the mutated retrovirus wipes out 90% of the human population. In *Rise of the Planet of the Apes*, an experimental drug is used to virally deliver gene therapy for Alzheimer’s disease; this declawed retrovirus is intended to be inhaled to promote neurogenesis. As the lead scientist Will Rodman (James Franco) is trying to save his own father’s (John Lithgow) deteriorating mind he self-justifies bypassing critical regulatory and safety procedures, and the drug is tested on a baby chimp in utero. The infant grows up to be Caesar (Andy Serkis) the revolt-leading intelligent ape who spearheads the rest of the sequels. The relaunch of the *Apes* franchise follows only a few years after *I am Legend*

(Lawrence, 2007) the most recent update to *The Last Man* myth, where a universal cancer immunotherapy cure mutates into a deadly plague; both plots have a pandemic emerge from a human-made mutated virus that was intended to benevolently save and extend human lives, not wipe them out.

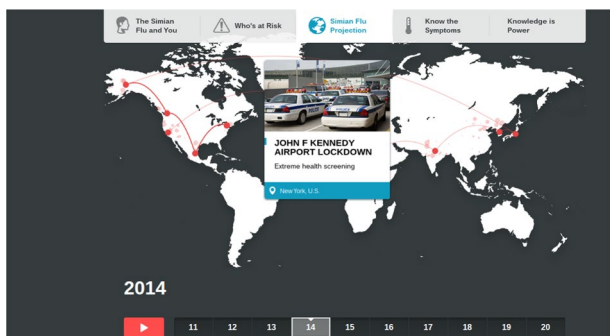
The shift to a viral narrative for the *Planet of the Apes* franchise begins with the mid-end-credit sequence of *Rise of the Planet of the Apes*; the scene is set in an international airport and reveals that the Simian strain is an extremely contagious airborne virus. The closing credits then visualise the speed of the spread through international flight paths that generate dynamic hot spots and explosive lines of transmission. The marketing for the first sequel *Dawn of the Planet of the Apes* constructed a paratextual trove of digitally distributed materials for marketing and world-building. The films imagine the immediate responses to a pandemic with the tone and messaging (PSAs and pamphlets) that have become part of *our* lived pandemic experiences.



Imagery from promotional material for *War for the Planet of the Apes* [1] that reuses material from the opening of *Dawn of the Planet of the Apes*’ explanation of the apocalypse.

As part of the marketing for *Dawn of the Planet of the Apes* and *War for the Planet of the Apes*, PSAs were created. The ‘Simian Flu: Public Service Announcement’ [42] uses simple graphic representations, a calming piano accompaniment, and kinetic typography animation that changes colour from white to red as a ‘single drop’ of red hits the text and then multiplies until the screen is all red. As Susanna Loza ([31]: 133) notes this style was ‘modelled on the public service announcements produced by the US Centers for Disease Control and Prevention for racialized pandemics like Swine Flu, SARS, Avian Flu, Ebola, and Zika’. These fictional PSAs notably replicate the centring of North American and Western European experiences (majority white populations) and expose the enduring ‘burden of racial and ethnic legacies’ of the Global North that contribute to the health and economic inequalities experienced by minority communities and nations outside of this wealthy region [21]. The *War for the Planet of the Apes*’ PSA ends with a then-live, but now defunct website SimianFlu.com and branding for the fake Office of Public Health Awareness (OPHA) rather than

explicit movie marketing including title, release dates, and casting information.



Data visualisation of the timeline and spread of the Simian Flu presented on the now defunct ‘SimianFlu.com’ website

The CDC exists in the diegesis of the recent *Planet of the Apes* films as represented by woman scientist Ellie (no last name) (Keri Russell) who was a CDC nurse who studied the Simian Flu and the immunity of the surviving humans (see [7]). But the CDC is not referenced in any of the marketing materials that offered an immersive entry point into this imagined public health disaster. Neither the filmmakers nor the CDC wanted there to be any confusion with a real-world event. SimianFlu.com communicated the spread of the disease from the present-day to the mid-2020s using timelines, PSAs, and heat map data visualisations. The website was also supposed to be an artefact, a remnant of failed public health management with a disease that caused the dawn of a planet dominated by non-human apes. By the time of the events of the second film (*Dawn of the Planet of the Apes*) small colonies of immune humans fight for their survival in a world where non-human nature has returned. Short teaser trailers published 6 months after the Simian Flu PSAs showed the rewilding of landmarks including London’s Big Ben and a San Francisco trolley [41]. This imagery became startlingly relevant during the COVID-19 lockdowns as wild animals took to the abandoned streets from March 2020 [17]. Despite these parallels to the pandemic, it was *Contagion* that caught the public imagination because of its ‘(investment) in the realities of science’ that offered hope for the future of humanity rather than pointing to its sudden and inevitable demise [22].

Conclusion: Taking Science Fictions Seriously

What the COVID-19 pandemic has shown on a global scale is that publics often understand and process the intricacies of science through the fiction they consume. Public health

authorities/agencies must consider the impact of science-based popular culture on the people they are trying to communicate with—ideas can be subtly and powerfully communicated through different platforms and not always in traditional science fiction narratives or science-focused broadcast media. This pandemic has shown ‘the power of speculative media to help audiences comprehend real-world crises’ and how quickly mis/information can go viral [38•]: 2). Once released, it is practically impossible to entirely eradicate.

COVID-19 forced the world into voluntary and involuntary quarantine. Isolated from the wider communities and social activities people turned to their streaming media to maintain at least a tenuous connection to the rest of the world. While real scientists attempted to find a cure and manage the crisis, uncertain publics looked to their fictional counterparts to find answers, comfort, and even to exacerbate their fears by watching the end of the world rather than just feeling like being perpetually on pause.

Microbiology plots have become ubiquitous in contemporary global science-based fictions. But the films that go viral are those with realistic settings and believable, authentic representations and resolutions of pandemics: *Contagion*, *Outbreak* (to a lesser extent), and the playability of the scenarios in games like *Plague Inc*. The narratives of playing against and fighting the contagion drew upon public familiarity with gaming, and the tracking of contagion eerily mirrored the statistics and scorekeeping that often frames the gameplay. Yet, the more outlandish narratives of intelligent apes and rage-ful zombies, despite their attention to scientific realism, were not where people looked when they wanted microbiology and public health knowledge from their movies. Science-based cinema (narratives that use science, although not necessarily science fiction) has become a key site for developing the public understanding of science (including civilian policymakers and funders) and thus, it is vital that scientists consider how their expertise/work is represented beyond the lab bench.

Declarations

Conflict of Interest The author declares no competing interests.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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References

Papers of particular interest, published recently, have been highlighted as: • Of importance

- 20th Century Studios UK. War for the Planet of the Apes | 'Virus' | Official HD Video. 2017. <https://www.youtube.com/watch?v=EfT1-l4s8o4>. Accessed 16 Dec 2022.
- Anon. Review of *The Last Man*. *The Monthly Review*; 1826. p. 333–335
- Carroll JS. The aesthetics of risk in *Dawn of the Dead* and 28 Days Later. *J Fantastic Arts*. 2012;23(1):40–59.
- CDC. Outbreak of ebola viral hemorrhagic fever -- Zaire, 1995. *Morbidity and Mortality Weekly Report (MMWR)*. 1995;44(19):381–2. <https://www.cdc.gov/mmwr/preview/mmwrhtml/00037078.htm>. Accessed 16 Dec 2022.
- CDC. Ebola virus infection in imported primates -- Virginia, 1989. *Morbidity and Mortality Weekly Report (MMWR)*. 1989;38(48):831–2, 837–838. <https://www.cdc.gov/mmwr/preview/mmwrhtml/00001512.htm>. Accessed 16 Dec 2022.
- Chambers AC. “The handsome astronomer and the yelling lady”: representing scientists and expertise. *JCOM*. 2022a;21(5):C04. <https://doi.org/10.22323/2.21050304>.
- Chambers AC. Representing women in STEM in science-based film and television. In: Jones CG, Martin AE, Wolf A, editors. *The Palgrave handbook of women and science since 1660*. Cham: Palgrave Macmillan; 2022b. p. 483–501. https://doi.org/10.1007/978-3-030-78973-2_23.
- Chambers AC. Movies and scientific accuracy. *Microbiol Today*. 2017a;44(4):191–2.
- Chambers AC. Evolution of the planet of the apes: Science, religion, & 1960s cinema. *J Relig Pop Cult*. 2017b;28(23):107–23. <https://doi.org/10.3138/jrpc.28.2-3.3399>.
- Cheng H, Kim HY, Reynolds JD, Tsong Y, Wong YJ. COVID-19 anti-Asian racism: a tripartite model of collective psychosocial resilience. *Am Psychol*. 2021;76(4):627–42. <https://doi.org/10.1037/amp0000808>.
- Columbia Public Health. #Stayhome #withme and Control the Contagion: Spreading Facts, Not Fear. 2020. <https://www.youtube.com/watch?v=D11xmIw0lk0>. Accessed 16 Dec 2022.
- Control the Contagion. <https://www.publikealth.columbia.edu/controlthecontagion>. Accessed 16 Dec 2022.
- Denby D. Call the Doctor' [review of *Contagion*]. *The New Yorker* [online]. 2011. <https://www.newyorker.com/magazine/2011/09/19/call-the-doctor-david-denby>. Accessed 16 Dec 2022.
- Dionne K, Turkmen F. The politics of pandemic othering: putting COVID-19 in global and historical context. *Int Organ*. 2020;74(S1):E213–30. <https://doi.org/10.1017/S0020818320000405>.
- Dynel M. COVID-19 memes going viral: on the multiple multimodal voices behind face masks. *Discourse Soc*. 2021;32(2):175–95. <https://doi.org/10.1177/0957926520970385>.
- Gao Z. Sinophobia during the Covid-19 pandemic: identity, belonging, and international politics. *Integr Psychol Behav Sci*. 2022;56:472–90. <https://doi.org/10.1007/s12124-021-09659-z>.
- The Guardian. The urban wild: animals take to the streets amid lockdown – in pictures. *The Guardian* [online]. 2020. <https://www.theguardian.com/world/gallery/2020/apr/22/animals-roami>
- [ng-streets-coronavirus-lockdown-photos](https://www.theguardian.com/world/gallery/2020/apr/22/animals-roami-ng-streets-coronavirus-lockdown-photos). Accessed 16 Dec 2022.
- Gilbey R. When old films go viral: how coronavirus gave *Contagion* an unexpected afterlife'. *The Guardian* [online]. 2020. <https://www.theguardian.com/film/2020/jan/30/what-can-we-learn-about-coronavirus-from-watching-contagion>. Accessed 16 Dec 2022.
- Gisondi MA, Barber R, Faust JS, Raja A, Strehlow MC, Westafer LM, Gottlieb M. A deadly infodemic: social media and the power of COVID-19 misinformation. *J Med Int Res*. 2022;24(2):e35552. <https://doi.org/10.2196/35552>.
- Hern A. Pandemic game *Plague Inc* climbs charts after coronavirus outbreak. *The Guardian* [online]. 2020. <https://www.theguardian.com/games/2020/jan/24/pandemic-game-plague-inc-climbs-charts-after-coronavirus-outbreak>. Accessed 16 Dec 2022.
- Hooijer G, King D. The racialized pandemic: wave one of COVID-19 and the reproduction of global north inequalities. *Perspect Polit*. 2022;20(2):507–27. <https://doi.org/10.1017/S153759272100195X>.
- Jabr F. How realistic is *Contagion*? The movie doesn't skimp on science'. *New Scientist* [online] [2011]. 2020. <https://www.newscientist.com/article/2239913-how-realistic-is-contagion-the-movie-doesnt-skimp-on-science/#ixzz6qF2108B2>. Accessed 16 Dec 2022.
- Kelly H. People have found a way to cope with pandemic fears: watching *Contagion*. *Washington Post* [online]. 2020. <https://www.washingtonpost.com/technology/2020/03/06/contagion-streaming/>. Accessed 16 Dec 2022.
- Khan AS. *Plague Inc.*' Centers for Disease Control and Prevention Public Health Matters Blog [online]. 2013. <https://blogs.cdc.gov/publichealthmatters/2013/04/plague-inc/>. Accessed 16 Dec 2022.
- Kirby DA, Ockert I. Science and technology in film: Themes and representations'. In: Bucchi M, Trench B (eds.) *Routledge handbook of public communication of science and technology*. 3rd ed. Longdon: Routledge. 2022. pp.77–96. <https://doi.org/10.4324/9781003039242>. **This is a revision of Kirby's original chapter (1st ed., 2008) now incorporating the expertise of historian of science and public broadcasting Ockert and updated scholarship to show the methods and importance of understanding representations of STEM on screen. Clearly presented for both science and communication researchers.**
- Kirby DA. Movie microbes under the microscope. *Microbiology*. 2013;14(4):17–9.
- Kirby DA. *Lab coats in Hollywood: science, scientists, and cinema*. Cambridge, MA: MIT Press; 2011. <https://doi.org/10.7551/mitpress/8483.001.0001>. **A seminal text in the study of scientists' involvement in the film industry as advisors and mediators of expertise on screen. Key arguments made about the necessary balance between believable and accurate science on screen and the need for active collaboration between scientists and filmmakers.**
- Kurilla R. “Kung Flu”—the dynamics of fear, popular culture, and authenticity in the anatomy of populist communication. *Front Commun*. 2021;6:624643. <https://doi.org/10.3389/fcomm.2021.624643>.
- Lee B. Songbird review – Hollywood's first Covid thriller is a technical triumph. *The Guardian* [online]. 2020. <https://www.theguardian.com/film/2020/dec/10/songbird-review-hollywoods-first-covid-thriller-is-a-technical-triumph>. Accessed 16 Dec 2022.
- Lewis D. On watching ‘*Contagion*’: what do we learn?. *Social Policy: An International Perspective* [online; blog of the London School of Economic's Department of Social Policy]. 2020.

- <https://blogs.lse.ac.uk/socialpolicy/2020/04/16/on-watching-contagion-what-do-we-learn/>. Accessed 16 Dec 2022.
31. Loza S. Speculative imperialisms: monstrosity and masquerade in postracial times. Lanham, MD: Lexington Books; 2017.
 32. Mailman School of Public Health. Control the Contagion. Columbia University [online]. 2020. <https://www.publichealth.columbia.edu/controlthecontagion>. Accessed 21 June 2023.
 33. Mason A. Songbird director Adam Mason: How I made the first COVID thriller in lockdown. NME [online]. 2020. <https://www.nme.com/features/film-interviews/songbird-director-adam-mason-how-i-made-the-first-covid-thriller-in-lockdown-2836995>. Accessed 16 Dec 2022.
 34. Milner A. Viral science fiction. *Extrapolation*. 2022;63(1):7–20. <https://doi.org/10.3828/extr.2022.3>.
 35. Moore KA. Readapting pandemic premediation and propaganda: Soderbergh's Contagion amid COVID-19. *Arts*. 2020;9(112):1–10. <https://doi.org/10.3390/arts9040112>.
 36. Morris W. For me rewatching Contagion was fun, until it wasn't. *The New York Times* [online]. 2020. <https://www.nytimes.com/2020/03/10/movies/contagion-movie-coronavirus.html>. Accessed 16 Dec 2022.
 37. Muñoz A, Moreno C, Luján JL. Who is willing to pay for science? On the relationship between public perception of science and the attitude to public funding of science. *Public Underst Sci*. 2012;21(2):242–53. <https://doi.org/10.1177/0963662510373813>.
 38. • Murray K, Paramita A. Editorial Introduction to the Special Issue: Viral Science Fiction: What Does It Mean to Go Viral After 2020? *Extrapolation*. 2022;63(1):1–5. <https://doi.org/10.3828/extr.2022.2>. **Recent special issue of the major SF journal Extrapolation published by Liverpool University Press that promotes dialogue between disciplines in the encouraging the serious discussion of science fiction/fantasy popular culture. Introduction to special edition covers key texts and approaches to understanding the use of science fiction under the shadow Covid-19. See also: Milner 2022.**
 39. Li Y, Nicholson HL. 'When "model minorities" become "yellow peril": othering and the racialization of Asian Americans in the COVID-19 pandemic. *Sociol Compass* 2021;15(2): e12849 [1–13]. <https://doi.org/10.1111/soc4.12849>
 40. Niburski K, Niburski O. Impact of Trump's promotion of unproven COVID-19 treatments and subsequent internet trends: observational study. *J Med Int Res*. 2020;22(11):e20044. <https://doi.org/10.2196/20044>.
 41. Planet of the Apes. Dawn of the Planet of the Apes | San Francisco Deterioration | PLANET OF THE APES. 2014. https://www.youtube.com/watch?v=UVQRB_qqkn8. Accessed 16 Dec 2022.
 42. Planet of the Apes. Simian Flu: Public Service Announcement | PLANET OF THE APES'. 2013. <https://www.youtube.com/watch?v=Y1G-WjeKcwQ>. Accessed 16 Dec 2022.
 43. • Raab MH, Döbler NA, Carbon C. A Game of Covid: Strategic Thoughts About a Ludified Pandemic. *Front Psychol*. 2021;12:607309. <https://doi.org/10.3389/fpsyg.2021.607309>. **Innovative interdisciplinary paper using ludic narratology theory to explore games and interactive outbreak narratives as essential cognitive strategies and cultural tools for navigating a global pandemic crisis. It explores the power of game mechanics for managing and promoting public understanding of contagion.**
 44. Saji S, Venkatesan S, Callender B. Comics in the time of a pan(dem)ic: COVID-19, graphic medicine, and metaphors. *Perspect Biol Med*. 2021;64(1):136–215.
 45. Scheck F. Songbird Film Review. *The Hollywood Reporter* [online]. 2020. <https://www.hollywoodreporter.com/movies/movie-reviews/songbird-film-review-4102728/>. Accessed 16 Dec 2022.
 46. Schmitz RS. The supernatural media virus: virus anxiety in gothic fiction since 1990. Bielefeld: transcript Verlag. 2021.
 47. Schweitzer D. Going viral: zombies, viruses, and the end of the world. New Brunswick: Rutgers University Press; 2018.
 48. Team Full Fact. Full Fact partners with Ndemc Creations on new Fake News game scenario'. Full Fact [online]. 2019. <https://fullfact.org/blog/2019/dec/full-fact-partners-ndemic-creations-new-fake-news-game-scenario/>. Accessed 16 Dec 2022.
 49. Tyler T. Misanthropy without Humanity. *Paradoxa*. 2014;26:239–46.
 50. Vultaggio M. Searches for 'Contagion Movie' Spike on Google. Statista [online]. 2020. <https://www.statista.com/chart/21053/contagion-movie-google-searches-coronavirus/>. Accessed 16 Dec 2022.
 51. Wald P. Preface. In: Becker S, de Bruin-Molé M, Polak S, editors. *Embodying Contagion: the viropolitcs of horror and desire in contemporary discourse*. Cardiff: University of Wales Press, xiii-xviii. 2021. <https://doi.org/10.16922/contagion>
 52. • Wald, P. *Contagious: Cultures, Carriers, and the Outbreak Narrative*. Durham, NC: Duke University Press; 2008. **Priscilla Wald's work on contagion media is central to the understanding of how these outbreak narratives are structured and disseminated, and influence epidemiology research and public understanding of emerging infections. Wald's broader scholarship lies at the intersection of science, medicine, bioethics, and popular culture.**

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