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How Do We See COVID-19? Visual Iconographies of Racial Contagion

Abstract Contagion media have historically performed the dual functions of scientific and ideological persuasion, often deploying an iconography of racial contagion that combines these two functions. In efforts to halt the spread of the virus, health, science, and media organizations create visual imagery to teach the public to imagine we can see and therefore avoid contaminants that are invisible to the naked eye. Comparison of COVID-19 with other global disease outbreaks shows how a core set of contagion media visualizations are repeatedly deployed with subtle adaptations for unique diseases and display interfaces. The variations among different corpora of contagion media point to the interplay among persistent, transhistorical tropes, particular sites of meaning production, and novel technical affordances. This article will examine a subset of these representational techniques, including microscopic images of the virus, close-ups of disease vectors, global and local maps of contagion, health workers in biohazard suits, and visibly ill patients. The essay argues that techniques for visualizing the invisible produce a narrative logic of causality in COVID-19 that reinforces racist and xenophobic discourses of containment and control with direct and deadly consequences. Mitigation of this pandemic and future pandemics will require not only medical but also representational interventions.

Keywords media, public health, representation, iconography, patients

How do we know when we're in an outbreak of invisible, infectious disease? Bills of mortality first appeared in London during the plague of 1596–98 (Heitman 2018), posted on church doors or village gates to alert communities to a danger in their midst. This early form of contagion media heightened citizens' awareness of the presence of disease, even if they did not fully understand what it was or how it spread. These bills also focused attention on a site of contamination that could be identified and avoided. Michel Foucault (1975) linked such plague containment efforts to the emergence of disciplinary projects that emphasized the power of surveillance through panopticism. The visual media of contagion thus functioned to convey

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some form of medico-scientific information, while also inciting behavior that would help prevent the spread of contamination. In blending these functions, contagion media often conflated scientific "facts" (Latour and Woolgar 1987) and moralistic or ideological values. These dual functions are still with us.

Hundreds of public health films and television broadcasts produced throughout the twentieth century performed the dual functions of scientific and ideological persuasion through an iconography of racial contagion that was remarkably consistent over time (Ostherr 2005). Comparison of COVID-19 with other global disease outbreaks shows how a core set of contagion media visualizations are repeatedly deployed with subtle adaptations for unique diseases and display interfaces. The variations among different corpora of contagion media point to the interplay among persistent, transhistorical tropes, particular sites of meaning production, and novel technical affordances, as are evident in representational techniques including microscopic images of the virus, close-ups of disease vectors, global and local maps of contagion, health workers in biohazard suits, and visibly ill patients.

The COVID-19 pandemic poses representational challenges that are unsettling yet familiar from past outbreaks of infectious diseases. In efforts to halt the spread of the virus, health, science, and media organizations create visual imagery to teach the public to imagine we can see and therefore avoid contaminants that are invisible to the naked eye. While aiming to present scientifically accurate information, these media forms also contain representational styles and iconographies drawn from past outbreaks, as they attempt to construct facts out of the uncertainty of an invisible threat. As Paula A. Treichler (1987: 32) argued in the context of AIDS, global disease outbreaks produce "an epidemic of signification", and COVID-19, with its abundance of data visualizations, global maps of contagion, and conspiracy theories is no exception. Techniques for visualizing the invisible produce a narrative logic of causality in COVID-19 that reinforces racist and xenophobic discourses of containment and control with direct and deadly consequences. Mitigation of this pandemic and future pandemics will require not only medical but also representational interventions.

Microscopic images of the virus. One of the most common representations of contemporary emerging infectious disease (EID) outbreaks is electron microscopic imagery of the virus causing the disease. This type of imagery, familiar from news media coverage of past outbreaks, highlights the central preoccupation of contagion imagery: visualizing the invisible. The proliferation of images of the coronavirus

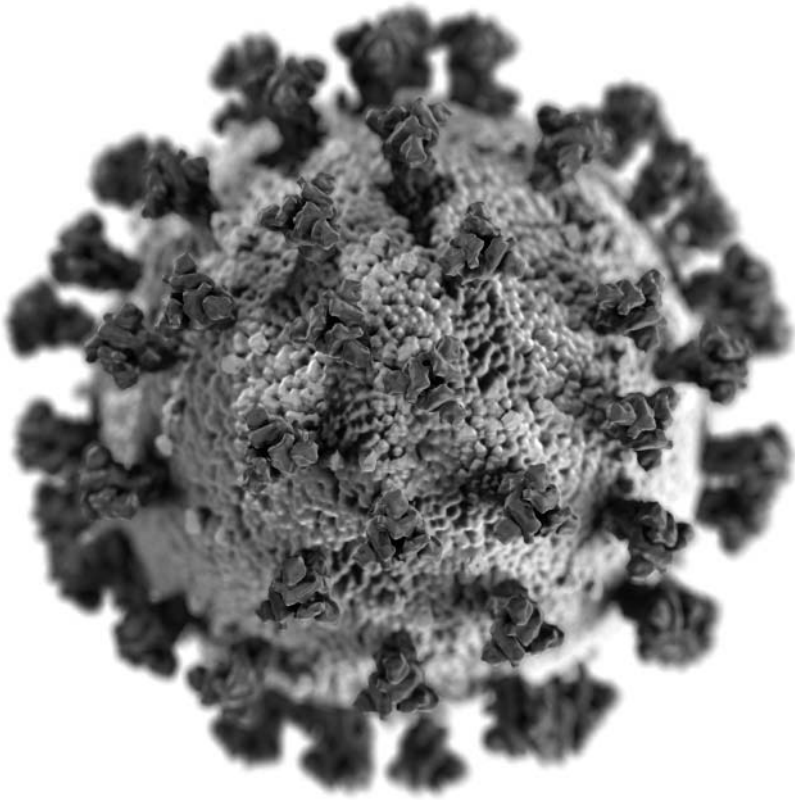

Figure 1 Electron microscope image of Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2), created at the Centers for Disease Control and Prevention (2020). ID#: 23312. Source: Alissa Eckert, Dan Higgins

(see fig. 1), with its distinctive crown-like shape, was one of the first and most enduring images from the COVID-19 pandemic (Gan 2020). While the precise molecular and genetic structure of a novel pathogen holds great importance for research scientists seeking to understand and control a disease outbreak, this imagery serves a distinct function for the broader public. First, microscopic imagery establishes a technoscientific perspective on the crisis, asserting knowledge, mastery, and control. The virus cannot be detected without the assistance of sophisticated, expensive machinery (electron microscopes and laboratory-based diagnostic media). Therefore, our ability to see the virus evinces the successful mobilization of the "biomedical industrial complex" (Clarke et al. 2003).

Second, microscopic imagery of viruses is simultaneously dehumanized and anthropomorphized. Virus depictions bear no resemblance to the human body suffering from the disease it causes, making these images appear scientifically neutral, objective, and impartial (Daston and Galison 1992). This perspective gives rise to the truism of global health campaigns that "disease knows no boundaries" (CDC 2019). Yet, the burden of disease does not fall evenly on all races and classes, as evidenced by data on health disparities (Hammonds and Reverby 2019; Levine, Foster, and Fullilove 2001) and the tendency in contagion media to anthropomorphize the virus (Wald 2008). Viruses are often conflated with their human hosts through metaphorical slippages that express racial and geopolitical views of pathology and contamination. In the case of COVID-19, elected officials used terms such as "foreign virus" (Goldberg 2020), "China virus" (Marlow 2020), and "Wuhan virus" (Zimmer 2020). Such rhetoric endows the invisible pathogen with malevolence and links the virus to the geographic site of discovery, often a tropical environment where rich biodiversity collides with human impingement on habitats to create ideal conditions for zoonotic diseases to emerge (Jones et al. 2008). Through these linkages, the sinister pathogen is associated with racist imagery of primitive settings and primordial threats, resulting in description of a prominent Chinese virologist as "Bat Woman" (Qiu 2020) and bats, presumed natural hosts of the novel coronavirus, as "biological super villains" (Hunt 2020). By fusing these perspectives, seemingly objective microscopic images of viruses become racialized pathogens in global health's pandemic imagery.

Close-ups of disease vectors. The prevalence of microscopic images of the pathogen in contagion media depends in part on the role of animal and insect disease vectors in a particular outbreak. While microscopic imagery of the coronavirus circulated widely as an icon of COVID-19 disease, the narrative logic of causality demanded a source—a disease vector—that would be visible to the naked eye. In historical outbreak media, the mosquito has been the most iconic disease vector, featured in health films about malaria, dengue, Yellow Fever, and other contagions. Diseases such as malaria afflicted American troops stationed in the South Pacific during World War II, and public health films were made to address the problem (Fedunkiw 2003: 1049). As these films attempted to train soldiers to avoid infection, they deployed racialized images of mosquitoes that conflated the idea of national bodily integrity with the destruction of foreign contaminants (see fig. 2). In this xenophobic imagery, mosquitoes were presented

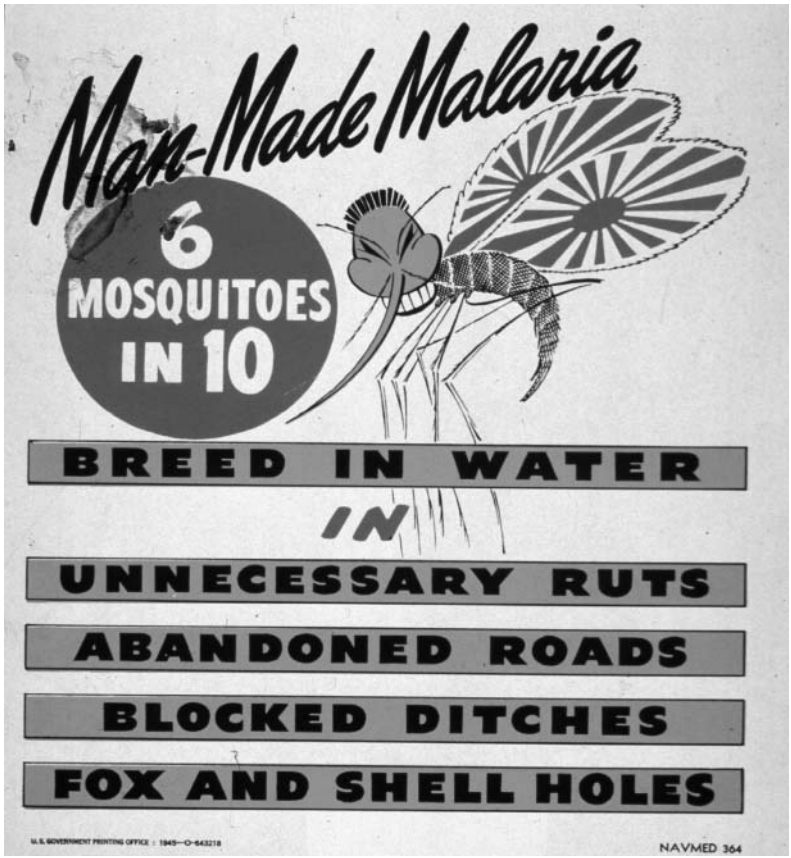

Figure 2 Poster shown in the film *Medicine in Action: Pacific Enemy Number Two-Malaria* (1944). US Navy Bureau of Medicine and Surgery, 1945

as racist caricatures of Japanese combatants. Because humans only become infected with malaria when bitten by mosquitoes carrying the plasmodium parasite, destruction of the disease vector—the mosquito—was the primary tactic in combatting the disease, followed by pharmaceutical prophylaxis, when available. The resulting narrative further anthropomorphized and racialized the mosquitoes, inciting viewers to hunt and kill them.

In the case of SARS-CoV-2, the virus that causes COVID-19 disease, the animal vectors are thought to be bats (Zaugg 2020), pangolins (Cyranoski 2020), and civet cats (Myers 2020), pictured in caves (Qiu 2020) and so-called wet markets (Standaert 2020) in China, where live

animals are sold alongside other types of produce for human consumption. An early study of the first known cases to emerge in Wuhan, China linked the human cases to exposure at the Huanan Seafood Wholesale Market, where the virus presumably "jumped species" (Huang et al. 2020). Scientists have estimated that 75 percent of EIDs are zoonotic: diseases caused by pathogens that leap from animals to humans (Gebreyes et al. 2014). In the past decade, numerous researchers have raised concerns that ecological factors including deforestation and climate change are increasing the rate of zoonotic disease emergence (Jones et al. 2008; Allen et al. 2017).

The epidemiological narrative for the SARS-CoV-2 virus traces its emergence to a single imagined bat, which contaminated another mammal, before the virus made the "spillover" to humans (Lynteris 2016). While virus hunting is certainly taking place in the environs of Wuhan, China, it is not taking place everywhere in the world that the virus has spread. Consequently, the iconography of the COVID-19 pandemic is not as replete with animal vector images as other epidemics have been. In the Zika virus outbreak of 2015–16, mosquitoes were hunted in every locale where a case of the disease was detected, because each new population of host vectors could become the source of a new disease hotspot. Consequently, contagion media in the Zika outbreak was full of images of mosquitoes. By contrast, once the vector of contagion for COVID-19 released the virus to a human host, the disease could no longer be halted through animal vector tracking, because humans became the hosts.

Global and local maps of contagion. The emphasis on visual representation of the pathogen as well as the animal or insect vector is critical for launching the cause-effect chain that enables responsibility for the outbreak to be assigned, with specific geographical coordinates of blame. The epidemiological narrative is further developed through the ubiquitous iconography of global maps of contagion. These images typically include transmission pathways and localized prevalence and are often annotated with travel advisories. Early in the current outbreak, the Johns Hopkins University COVID-19 Dashboard (see fig. 3) began mapping every infection site in the world, quickly becoming a constant citation for politicians and news media. The ubiquitous presence of this data source highlights the continued importance of world maps for visualizing the spread of outbreaks, as well as the new mandate for real-time disease surveillance (Engelmann 2020) to continually test whether a given hotspot has successfully "flattened the curve" (Roberts 2020). Another COVID-19 HealthMap (OpenStreetMap

Figure 3 Johns Hopkins University COVID-19 Dashboard. Center for Systems Science and Engineering at Johns Hopkins University 2020

2020) presented an animation that visualized the spread of the virus from its origins in China throughout the world. Much like animated maps utilized in health films of the past, this representation slowly filled in country by country, until entire continents were covered by the colored dots that represented their caseloads. Unlike maps in health films of the past, however, this graphic was updated daily and offered tailored views: users could select from the country list to zoom in on specific parts of the map and see the exact number of cases in each locale.

The prevalence of global maps in disease outbreaks is central to the logic of epidemiology that drives much contagion imagery. Maps enable the depiction of a causal chain—the outbreak starts "there" and then spreads "here" (Wu et al. 2020). These images often include arrows tracing the flow of contagion, emphasizing the source of blame ("there") and further drawing attention to the role of national boundaries in disease containment strategies. The preoccupation with computer-generated data visualizations has been a notable feature of the COVID-19 outbreak. Indeed, time-lapse mapping of the spread of infection is more ubiquitous in this outbreak than in any past

epidemic. This is due in part to the technical affordances and availability of free and open source data tools, such as Geographic Map Open Objects Source Environment (GeoMOOSE 2020) and various Geographical Information Systems (GIS) tools such as the Environmental Systems Research Institute (ESRI 2020) ArcGIS Hub Coronavirus Response template, the foundation upon which the Johns Hopkins and numerous other tracking sites were built (University of Minnesota Center for Infectious Disease Research and Policy 2020).

The emphasis on mapping, while consistent with contagion media tropes dating back two hundred years, leads to a fallacy that shaped the early stages of the COVID-19 outbreak with devastating effect. The focus on maps visualizing the geographical source of contagion reinforced the xenophobic logic of causality which informed early efforts at containing the spread of the virus through travel restrictions. If a virus originated "there," and we want to stop it from coming "here," the logic goes, we must stop all travel from there to here. In addition to reinforcing anti-Chinese and anti-Asian sentiment, this logic provided the misguided rationale for early COVID-19 screening criteria that prevented many ill and potentially infected patients from being eligible for testing. The CDC guidelines for the first months of the pandemic required patients to have a fever, signs of lower respiratory illness, and either close contact with a laboratory-confirmed COVID-19 patient or a history of travel to China within fourteen days of symptom onset to qualify for a test (CDC 2020). The overemphasis on global maps of the flow of contagion encouraged a false sense of security based on fortification of borders and heightened suspicion of travelers, presenting the misleading impression that these measures would keep "us" safe by keeping potentially infected "others" out.

Health workers in face masks and biohazard suits. While microscopic images of the virus, depictions of disease vectors, and global maps represent the threat of contagion at increasing scale, images of workers covered in protective gear shift the focus from invasion to defense. During the 2016 outbreak of Zika virus (named after the Zika Forest in Uganda), figures in biohazard suits were shown spraying pesticides in neighborhoods where outbreaks had occurred to kill disease vectors (Ostherr 2020). In contrast, during the COVID-19 and Ebola outbreaks, the workers in face masks and hazmat suits were health care providers, and the biohazards were the patients themselves. Lack of adequate personal protective equipment (PPE) has been a defining feature of the US coronavirus outbreak (Schlanger 2020), and imagery of makeshift PPE, ranging from homemade face

masks to ski goggles ("Goggles for Docs" 2020), raincoats, welding masks, plastic garbage bags, and other reclaimed supplies (Livingston, Desai, and Berkwits 2020) has symbolized the severity of the threat and the desperate ingenuity of healthcare providers on the front lines.

Within contagion media, the representation of health workers in hazmat suits has historically functioned to establish a sense of mortal danger and existential risk posed by a global pathogenic threat, while also carrying talismanic properties of security and defense (Lynteris 2018), invoking militaristic imagery of battle, war, and sacrifice. These images are familiar from news media coverage of Ebola and AIDS, as well as fictionalized dramatizations of epidemics in the movies *And the Band Played On* (1993), *Outbreak* (1995), and *Contagion* (2011). Typically, full-body hazmat suits are seen in images of workers in biosafety level 4 laboratories and on field investigators at EID hot zones, such as the villages near the Ebola River in the Democratic Republic of Congo, and Wuhan, China (Xiao, Koettl, and Kim 2020). These impermeable whole-body garments, often worn with a self-contained breathing apparatus, are meant to seal the human body off from the hostile environment, preventing exposure to harmful pathogens. In their similarity to space suits for astronauts, biohazard suits convey a technological dominance over nature that aesthetically underscores the contrast between the prepared and protected biomedical responders and the vulnerable, suffering victims at the site of the new disease outbreak. Covered in biohazard space suits, scientists searching for bats are protected from disease vectors and victims alike, and such images of technoscientific security are contrasted with racialized images of cultural primitivism (Vargas 2020). In scenes of the COVID-19 pandemic in the United States, however, visual images of mastery and control are as scarce as the clinical armaments of defense.

Visibly ill patients. The lack of adequate PPE in the COVID-19 pandemic has destabilized the iconography of healthcare workers as invincible warriors, armed with the weapons of modern biomedicine. One side effect of this representational and infrastructural failure is the inability to represent patients or the interiors of hospitals where they are being treated. While news coverage of the coronavirus pandemic has conjured images of acutely ill patients being intubated, placed on ventilators, and in extreme cases, on extracorporeal membrane oxygenation (ECMO) machines (a type of heart-lung bypass), the general public has not seen these images. The pictures that emerge from the few professional journalists who are granted direct

access to hospital COVID-19 wards convey a strong sense of public relations approval, having undoubtedly passed through review by the hospital's legal and marketing teams (Boodman and Walker 2020). The limited press access is not only a matter of limiting viral exposure for reporters, staff, and patients; it is also a matter of limiting liability. The inadequate preparedness of the US healthcare infrastructure is a national catastrophe and a humanitarian disaster, and individual hospitals do not want it to become a public relations scandal. Perhaps understandably, hospitals only want to show their courageous doctors, nurses, and other staff members, fighting valiantly to save lives (Kristof 2020).

A few harrowing short videos have been posted on social media sites by health care workers in China, Italy, New York, Boston, and other hot zones, and frontline workers in those locales have emphasized the harms of keeping these images out of public sight. As one critical care doctor volunteering in a New York hospital described it, "The truth is that this is one of those things that you really can't understand till you see it. You really have to see it. And that's the problem. Nobody is seeing it" (Weiss 2020). A patient suffering from the coronavirus in Milan told a scholar in the United States, "If people could only see what it is like in the hospitals, they would stay at home" (Lewis 2020). Variations on this theme have echoed throughout unofficial COVID-19 contagion media: we are suffering from an epidemic of absent signification. Even photographs of the dead are almost nonexistent in the United States. When a photographer used a drone to document burials in a mass grave on Hart Island near New York City, police officers confiscated the drone and attempted to seize the camera footage as well (Robbins 2020).

In the few images of patients that emerge from inside US hospitals (see fig. 4), faces are blurred or blocked by strategic camera positioning to preserve their privacy (Office for Civil Rights [OCR] 2016). In contrast, patient faces in images from the outbreak in China are not blurred, pixelated, or strategically blocked from view. Is this a subtle aesthetic reinforcement of the xenophobia that pervades contagion media, a reflection of different ethics conventions in different cultural contexts, or both? Until relatively recently, patient privacy was not considered in medical photography or cinematography. The visual aesthetic of the anonymized patient is a result of the requirement to respect patient autonomy through protected health information guidelines enshrined in the Health Insurance Portability and Accountability Act (HIPAA) of 1996 (Office for Civil Rights [OCR] 2008). Shortly

Figure 4 Lieutenant (junior grade) Natasha McClinton, a surgical nurse, prepares a patient for a procedure in the intensive care unit aboard the US hospital ship USNS Comfort (April 23, 2020). Source: US Navy Mass Communication Specialist Second Class Sara Eshleman

before that law was passed, amid heated debates over representation of patients with HIV/AIDS, guidelines were issued to protect patient privacy in images published in research articles (International Committee of Medical Journal Editors 1991; 1995).

Yet, the style of images of patients in the COVID-19 pandemic is markedly similar to the approach to filming patients in clinical settings before ethics guidelines were established. In surgical films from the 1890s to the 1990s (and in some cases, even after), the inner organs and other vulnerable parts of patients undergoing procedures in hospitals were routinely captured on film and exhibited to audiences worldwide without any consideration of the patient's wishes nor recognition of their contribution to medical knowledge (Ostherr 2013). This was especially true when those patients were the local inhabitants of colonized settings, on display to further the imperial pursuit of tropical medicine (Vaughn 1991). In COVID-19 images, we see patients' feet, hands, or other nonidentifying body parts. These images are anonymous—but hardly dignified. If we could really see the patients dying of COVID-19, what would we see? The missing images of suffering, if presented as a statistically representative sample, would show black and brown bodies, reflecting the racial health disparities that characterize American health care in general and this outbreak in particular (Johnson and Buford 2020). These images would show that xenophobic representation of racialized contagion, long

mobilized in nationalist rhetoric of American exceptionalism, is in fact a pathology at the heart of American visual culture today.

By looking at iconographic images of the COVID-19 pandemic as vehicles for disseminating ideas about racialized contagion in the United States, we can begin to disentangle the ideological and scientific functions of contagion media. Many of these images do not seem on the surface to be about race, yet, when examined in relation to the broader ecosystem of images, narratives, and networks of signification mobilized by the pandemic, deeper sets of associations begin to emerge. Just as many ostensibly neutral medical devices carry profound and harmful racial legacies (Braun 2014; Cooper Owens 2018), so, too, do the seemingly objective iconographies that shape cultural imaginings of the visual contours of invisible disease. The purpose of this study is not to cast blame on any individual representation. Rather, the goal is to document and interpret imagery that may otherwise pass unnoticed in the unending stream of media that gives shape to this pandemic, so that less harmful alternatives may be considered. Excavating the "dark matters" (Rodríguez-Muñiz 2016) of medical and scientific representation is essential to understanding the epistemologies underpinning this crisis of signification. Critical interventions that help reshape how we see COVID-19 must play a vital role in the future of our pandemic response.

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