



OPEN ACCESS

Eugenics and genetic screening in television medical dramas

Ayden Eilmus ,^{1,2} Jay Clayton ³

¹Division of Medical Ethics, New York University Grossman School of Medicine, New York, New York, USA

²Center for Genetic Privacy and Identity in Community Settings, Vanderbilt University, Nashville, Tennessee, USA

³Department of English, Vanderbilt University, Nashville, Tennessee, USA

Correspondence to

Dr Jay Clayton, Department of English, Vanderbilt University, Nashville, Tennessee, USA; jay.clayton@vanderbilt.edu

Accepted 27 February 2024
Published Online First
25 March 2024

ABSTRACT

Medical dramas offer unique insights into the way popular media makes sense of genetic technology and the ethics of its applications. In this paper we evaluate the contrasting depictions in television medical dramas of reproductive genetic screening and eugenics—two medical themes that some commentators see as closely related. By conducting a content analysis of 32 episodes of doctor shows featuring eugenic and/or genetic screening themes, we put the medical drama landscape in conversation with bioethics scholarship and mark a significant divergence between the two. While the academic literature has been parsing the possible relationship between genetic screening and eugenics for over 50 years, doctor shows tend to champion genetic screening as a powerful tool for promoting individual reproductive choice and criticise eugenics as a socially unjust infringement of reproductive freedom. In doing so, medical dramas mark a subtle but important moral distinction between the population-level implications of eugenics and the highly personal, emotional impact of genetic screening.

INTRODUCTION

Medical dramas are one of the most popular and long-running forms of serial television. Research has shown that regularly watching doctor shows can have an impact on viewers' attitudes toward their healthcare (Rocchi 2019, 74) by influencing real-life expectations and satisfaction with the treatment they receive (Berger 2010, A22; Hoffman *et al.* 2017, 121), by shaping their views of physicians (Quick 2009, 51), by informing attitudes and behaviours around specific medical interventions (Morgan *et al.* 2009, 146; Asbeek Brusse *et al.* 2015, 402), and by serving as a source of medical information (Davin 2000, 110; Hether *et al.* 2008, 816). In the case of the rapidly evolving field of genetics, television medical dramas offer a way to explore the social and ethical implications of emerging medical technologies before they ever reach a hospital floor. Unlike science fiction and horror films, medical dramas contribute a largely positive depiction of genetics (Furman and Clayton 2022, 39). With their relatable characters and affecting narratives, doctor shows offer viewers an inviting context in which to evaluate the moral permissibility of different uses of genetics in medical care.

The relationship between genetic screening and eugenics is a case in point. The National Human Genome Research Institute defines eugenics as the scientifically inaccurate theory that humans can be improved through selective breeding. Reproductive

and prenatal genetic screening,¹ which are sometimes seen by their critics as leading to eugenics, involve testing for deleterious genetic variants. Medical dramas uniformly present eugenics in a negative light, but they view reproductive genetic screening more favourably, despite the fact that some commentators in both the bioethics community and popular media have raised concerns about the potential eugenic effects of prenatal genetic screening (Shakespeare 1998, 679; Thomas and Rothman 2016, 410; Navon 2020, 888). The medical drama genre's approach to the connection between prenatal testing and eugenics offers unique insights into the public discussion about whether genetic screening is a 'backdoor to eugenics' (Duster 1990, 130).

Public attitudes towards eugenics have evolved over time, and so has its portrayal in popular media. In its earliest appearances in films (from 1912 to 1945), eugenics was represented in a positive light, paralleling the largely favourable public attitudes towards measures to restrict childbirth among people regarded as 'unfit' (Gibbons *et al.* 2021, 10–11). Following the revelations of atrocities by Nazi doctors, eugenics largely disappeared from public discourse, although state-run sterilisation programmes continued. Anxieties about eugenics later re-entered public discourse when the sequencing of the human genome brought about the possibility of eliminating genetic disease and enhancing genetic traits. In Kevles' history of eugenics he puts this concern rather bluntly: 'The specter of eugenics hovers over virtually all contemporary developments in human genetics' (Kevles 1995, vii). Whereas post-World War II concerns about population-level enforcement of eugenic ideas were primarily associated with the state, the widespread availability of genetic screening allowed these worries to creep into the privacy of the doctor's office.

In the dystopian plotlines of science fiction featuring genetics, the danger of eugenics is hard to miss. But the presence of genetic screening and eugenic plots in the more quotidian genre of the medical drama introduces audiences to the more individualistic ways that eugenics can rear its head. In TV medical dramas, doctors, patients, families and ethics committees must grapple with the moral dilemmas that arise from genetic science in less hyperbolic but more personal ways, like using genetic screening for 'diving into the deep end of the gene pool' when selecting a sperm donor (*Chicago Hope* S5.E12) or discovering that patients were previously sterilised without their knowledge (*Chicago Med* S3.E6). While some series draw



© Author(s) (or their employer(s)) 2024. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Eilmus A, Clayton J. *Med Humanit* 2024;**50**:408–416.



attention to the ways that eugenics was historically enforced for the purported benefit of society, the majority of medical drama episodes offer a contrasting story that portrays questions about the use of potentially eugenic genetic technologies as, ultimately, deeply personal. Medical dramas depict reproductive decisions after an unwelcome result from a prenatal test as ethically fraught within the context of individuals' lives rather than on a larger societal scale. As a result, doctor shows tend to champion genetic screening as a powerful tool for promoting individual reproductive choice and criticise eugenics as a socially unjust infringement of reproductive freedom. In doing so, medical dramas mark a subtle but important moral distinction between the population-level implications of eugenics and the highly personal, emotional impact of genetic screening.

The reasons for this disjunction are complex. Clearly, the genre conventions of contemporary doctor shows, which draw on soap operas and other melodramatic forms, focus attention on the intimate and familial context as opposed to systemic concerns raised by eugenics. The largely female target audience of contemporary doctor shows is also a significant factor. Genetic screening is closely connected to reproductive issues, and it has been both championed by activists as a tool for promoting free choice and weaponised by legislators as a way to further restrict it (Clayton 2021). It makes sense, then, that television medical dramas centre the female experience in the stories they tell about genetic screening.

Distinguishing between personal decision-making and systemic injustice is not characteristic of how current medical dramas deal with other social issues. As Jason Jacobs describes in *Body Trauma TV*, the genre has evolved significantly since its beginnings in the 1960s and 1970s, when the controlled image of the paternalistic white male doctor was the focus of many early series. Since then, the changing cultural context of medicine has broadened medical dramas' scope and brought the politics of healthcare to the forefront of its plotlines (Jacobs 2003). Now, twenty-first century doctor shows often engage explicitly with emerging controversies and politically charged conversations in the medical field by refracting them through personal narratives, including transgender healthcare, underinsurance, and most recently, the COVID-19 pandemic. Popular series such as *Grey's Anatomy* (2005–present) are celebrated by many fans because they highlight structural inequality and social concerns, as well as physicians' and patients' relationships to those issues. Moreover, the show's timely depiction of current events ripped straight from the headlines ensures the series' place in ongoing public debates about these topics. While many current doctor shows are willing to address systemic problems in medical care, television medical dramas are preoccupied with genetic screening's impact on individual characters rather than on the world at large.

In this paper we evaluate the contrasting depictions in television medical dramas of reproductive genetic screening and eugenics—two medical themes that some commentators see as closely related. Conducting a content analysis of 32 episodes of doctor shows featuring eugenic and/or genetic screening themes, we put the medical drama landscape in conversation with bioethics scholarship and mark a significant divergence between the two. While the academic literature has been parsing the possible relationship between genetic screening and eugenics for over 50 years, the popular media landscape largely elides this issue by obscuring questions of whether or not genetic testing leads to reproductive decisions that have eugenic consequences.

This paper is divided into three sections. The first section provides a brief history of eugenics and other contextual

considerations, then outlines our methodology. Next, in 'Sterilization Then and Now', we discuss medical dramas' portrayal of eugenics and its social motivations. The third section turns to 'Contemporary Reproductive Decision-Making' and the individual impact of new genetic screening technologies as it is depicted in popular media.

BACKGROUND AND METHOD

The portrayal of eugenics in film and television has shifted dramatically over time. One of its first appearances on screen occurred in D W Griffith's 1912 *Man's Genesis*, in which racialised eugenics is portrayed as begetting social progress. This favourable depiction is typical of pre-World War II films featuring eugenic themes (Kirby 2007, 90). The attitude of recent depictions of eugenics in the popular media, in contrast, is largely negative and warns audiences of the dangers of using technology to manipulate human life. Sci-fi films in particular employ the fantastic and dystopian conventions of the genre to caution against disastrous applications of genetic technology for eugenic ends.

Medical dramas rarely treat eugenics explicitly, but they portray genetics relatively positively, especially when compared with action genres such as science fiction, horror and thrillers. Whereas most big-budget science fiction films and TV serials portray genetics in negative terms, as in *Gattaca's* eugenic dystopia, *Jurassic Park's* cloning experiment gone wrong or *Orphan Black's* nefarious biotech corporation, most medical dramas offer a mixed and messy representation of its pros and cons and follow characters as they weigh these risks and benefits in personal terms (Furman and Clayton 2022, 42). This difference underlines the specificity of the treatment of genetic screening in medical dramas. Many episodes focus specifically on genetic screening, often as it relates to reproduction.

The role of preimplantation and prenatal genetic testing in reproductive decision-making has remained contested since amniocentesis was established as a standard of care in high-risk pregnancies in the 1970s (Franklin and Roberts 2006, 92; Parens and Asch 1999, S2; Rapp 2000, 46). Some advocates for disability rights maintain that prenatal genetic testing encourages ethically unwarranted termination of pregnancies for conditions such as Down's syndrome. The rise of safer, less invasive and increasingly popular screening techniques has raised further questions about social values and medical freedom. While genetic testing can provide families with more information and more options, some commentators contest the extent to which subsequent reproductive choices are really free. Shakespeare argues that the mere existence of prenatal genetic testing may create pressure to use it (1998, 676). Gaventa *et al* see an inherent tension between public health goals of preventing disease and disability and the aims of disability rights advocates: 'health and disability have long been perceived as antonymous' (Gaventa *et al.* 2020, 129). Hence it is not surprising that some fear that genetic testing poses an existential threat to their communities, likening genetic testing to eugenics and even genocide (Denworth 2014; Shakespeare 1998, 668).

These are difficult issues, which bioethics and disability scholars are actively debating (Perez Gomez 2020, 99 Knight and Miller 2021, 2; Ravitsky 2017, S38; Thomas and Rothman 2016, 410). The purpose of this paper, however, is not to determine whether or not these concerns are justified. Our focus, instead, is on the way television medical dramas may inform lay perspectives on genetic screening. The episodes in our data set do not foreground questions of ableism, disability rights or what

counts as a medical condition—these topics almost never come up.² Instead, the episodes we examine shed light on another important topic—how popular media interprets the ethics of genetic testing for its viewers. In this project, we join a growing body of research on genetics in television and film (Bull 2019; Domaradski 2021; Hamner 2017; Stacey 2010), which explores questions of identity via the topic of cloning (Haran and O’Riordan 2017; Haran *et al.* 2007; O’riordan 2008), kinship (Bull 2014; Dillender 2018), race (Taylor and King 2022), mutation (Grimsted *et al.* 2024), assisted reproduction (Lieberman 2018) and privacy concerns (Oliver *et al.* 2021; O’Riordan 2020).

To examine the relationship between genetic screening and eugenics on TV our research group surveyed 5217 television medical drama episodes that aired on US television between 1961 and 2020 (The method of collecting these episodes and identifying those with substantial genetic content is outlined in Furman and Clayton, 2021). Drawing on crowd-sourced plot synopses from Wikipedia and IMDB, we selected 143 medical drama episodes to be coded by two independent researchers for a variety of formal features, genetics topics, and attitudes towards science and medicine. Of those 143 episodes, 35 episodes were found to concern *eugenics* and/or *genetic screening*. While popular discourse about modern eugenics and genetic screening sometimes conflates the two, we are interested in disambiguating television’s portrayal of genetic screening and eugenics, and thus

we examined all episodes that were coded for either theme. In doing so, we hope to clarify the terms in which television frames this public debate. Three of these 35 episodes were eventually excluded from our analysis due to difficulties accessing complete, watchable versions of them. A content analysis was conducted on our final data set of 32 television medical drama episodes, which are listed in [table 1](#).

The first author watched all 32 episodes in their entirety. Detailed, time-stamped notes were taken throughout the viewing process. These notes were then uploaded to MAXQDA where an emerging code book was constructed by the coauthors. The codebook was developed not to conduct quantitative analysis but to guide qualitative analysis and organise important themes as they emerged directly from the data. Example codes include genetic engineering for enhancement, state-sponsored involuntary sterilisation, forgoing genetic screening and eugenics to address overpopulation.

Medical dramas rarely discuss eugenics explicitly. Only five episodes set in contemporary times were originally coded for eugenics based on their Wikipedia and IMDB summaries.³ Some recount stories involving involuntary sterilisation (*Chicago Hope* S6E16, *Chicago Med* S3E6), while others tackle prospective parents’ quests to find an ‘ideal’ sperm donor (*Doogie Howser, M.D.* S1E2, *Chicago Hope* S5E12), and one episode grapples with the ethics of providing medical treatment to a foreign

Table 1 Medical drama episodes coded for eugenics and/or genetic screening

Series	Season	Episode	Title	Eugenics/genetic screening	Year of release
The Bold Ones: The New Doctors	1	7	And Those Unborn	Genetic screening	1969
Chicago Hope	5	12	Adventures in Babysitting	Eugenics	1999
Chicago Hope	6	16	Simon Sez	Eugenics	2000
Chicago Med	3	6	The Ties That Bind	Eugenics	2018
Doogie Howser, M.D.	1	2	The Ice Queen Cometh	Eugenics	1989
A Gifted Man	1	12	In Case of Blind Spots	Genetic screening	2012
Grey’s Anatomy	9	15	Hard Bargain	Genetic screening	2013
Grey’s Anatomy	9	18	Idle Hands	Genetic screening	2013
Grey’s Anatomy	9	19	Can’t Fight This Feeling	Genetic screening	2013
Grey’s Anatomy	11	2	Puzzle With a Piece Missing	Genetic screening	2014
Grey’s Anatomy	11	10	This Bed’s Too Big Without You	Genetic screening	2015
Grey’s Anatomy	11	11	All I Could Do Was Cry	Genetic screening	2015
Grey’s Anatomy	11	16	Don’t Dream It’s Over	Genetic screening	2015
House	1	2	Paternity	Genetic screening	2004
House	4	16	Wilson’s Heart	Genetic screening	2008
House	5	6	Joy	Genetic screening	2008
House	6	4	The Tyrant	Eugenics	2009
The Knick	2	3	The Best With the Best to Get the Best	Eugenics	2014
The Knick	2	4	Wonderful Surprises	Eugenics	2014
The Knick	2	5	Whiplash	Eugenics	2014
The Knick	2	8	Not Well At All	Eugenics	2014
The Knick	2	9	Do You Remember Moon Flower	Eugenics	2014
The Knick	2	10	This is All We Are	Eugenics	2014
Marcus Welby, M.D.	1	18	Dance to No Music	Genetic screening	1970
Marcus Welby, M.D.	2	11	To Carry the Sun in a Golden Cup	Genetic screening	1970
Nip/Tuck	1	13	Escobar Gallardo	Genetic screening	2003
Nip/Tuck	4	10	Merrill Bobolit	Genetic screening	2006
Private Practice	1	2	In Which Sam Receives an Unexpected Visitor	Genetic screening	2007
Private Practice	1	6	In Which Charlotte Goes Down the Rabbit Hole	Genetic screening	2007
Private Practice	2	6	Serving Two Masters	Genetic screening	2008
Private Practice	4	16	Love and Lies	Genetic screening	2011
Royal Pains	7	3	Playing Doctor	Genetic screening	2015

political tyrant who is responsible for genocide in his home country (*House* S6E4). After watching the shows in our data set, additional eugenic themes were revealed in episodes originally coded only for *genetic screening* based on their crowdsourced synopses (*Marcus Welby M.D.* S1E18). Most of these episodes, however, are not explicit in their discussion of eugenics. Rather, they tell stories about reproductive technology that might be interpreted as having eugenic consequences. When doctor shows do engage directly with the subject of eugenics, it is most often through the lens of sterilisation.

Patient and public involvement

Our content analysis of television shows did not require the involvement of viewers other than the authors. Hence no patients or public were involved in this study.

'Someone Didn't Want Anyone Like Me Around': sterilisation then and now

Most episodes coded for eugenics in our data set come from a single television series, Stephen Soderberg's historical drama, *The Knick* (2014–2015), which recounts the rise of medical eugenics in early twentieth-century America. *The Knick* diverges from medical dramas set in contemporary times in important ways. Whereas typical doctor shows are targeted to a female audience, framed as soap operas, and sometimes derided for their focus on the characters' relationships, sexuality and personal lives rather than the accuracy of their science, *The Knick* is an example of prestige television with high production values, critical acclaim and a decorated filmmaker as its director. The show, which has been praised for the accuracy of its science, employed internationally recognised historian, archivist and photograph collector Dr Stanley Burns as a medical consultant (Epstein 2016). The series earned eight Emmy nominations and one award—for Outstanding Production Design for a Narrative Period Programme—over the course of its 2-year run. It is artistic, highbrow, and borrows more in form from period pieces that might appear on *Masterpiece Theatre* than from shows such as *Grey's Anatomy* or *Private Practice*. Its portrayal of eugenics is informed by these artistic and generic choices and separates it from other series in our data set.

One way in which *The Knick* mirrors other medical dramas is in its thoroughgoing disapproval of eugenics. Sterilisation is the primary pathway through which eugenics measures are enacted in the show, and the social prejudice and population-level motivations behind it are explicit. The procedure is introduced as the answer to a variety of issues, including the supposed preponderance of 'mental defectives' (S2E5), addiction (S2E5), and crime (S2E4) among the lower classes and immigrants arriving in New York at the turn of the century. Notably, the anti-immigrant rhetoric of *The Knick*'s historical account coincided with a present-day increase of xenophobia and political tension in the USA in the lead up to the 2016 presidential election and beyond. The show's first season, which focused on racial injustice, was similarly reflective of contemporary social anxieties. By recalling abhorrent early twentieth-century solutions to twenty-first century problems, *The Knick* reminded viewers that we have had similar debates before and implicitly urged the audience to draw a lesson for their own time period.

In one sinister example from an episode titled 'Wonderful Surprises', a group of doctors discuss the problem of immigration (S2E4):

Doctor Drexler: Eugenics is a new science. It's up to us to sound the alarm and spread the word. However, it is not enough to get the

people to see the problem. It's getting them to have the will to do something about it.

Doctor Gallinger: Closing all the ports to immigrants would be an excellent place to start.

Doctor Drexler: It would be, but that requires political power and the courage to act and not be taken in by the pitying handwringers. We know we need a more permanent approach, a medical solution to stop the growth of what has already passed through our doors.

Doctor Gallinger: How? They breed like animals.

Doctor Drexler: And how do you stop an animal from breeding?

Doctor Gallinger: You neuter it. Sterilization.

Doctor Drexler: On a mass scale.

(*They drink to the idea*) (Timestamp 50:30)

In the next episode, while one doctor agonises over his research to identify the part of the brain that controls opium addiction in the hopes of developing a cure, his colleagues suggest what they consider to be a much simpler approach to the problem: vasectomy. 'If we can prevent those unfortunates from producing their own offspring, the amount of congenital defectives will be decreased. Subsequent generations of our race will be that much better going forward' (S2E5, timestamp 34:36).

This eugenic proposal is then put into action when a physician in *The Knick* sterilises dozens of institutionalised adolescent boys (S2E5). Deemed 'morons' and committed to a mental asylum by the court during their childhood, the institution is legally obligated to release them once they reach adulthood, leaving them free to 'engender more idiots like themselves' (S2E5, timestamp 13:25). When the offending doctor must later go before a judge for performing unauthorised vasectomies on minors 'who had no say in their permanent alteration,' he defends himself bluntly: 'Cripples, imbeciles, criminals, defectives—I spare the world from their line in order to benefit the greater good' (S2E9, timestamp 23:48).

The outrage this story conjures is about injustice, and rightly so. This careful presentation of the injustice of eugenics, in which racial and class inequities are foregrounded, contrasts sharply with the close-up, emotional terms in which typical medical dramas often frame reproductive decision-making and other ethical choices. Sterilisation, when it occurs as a topic in doctor shows set in our contemporary world, is instead mediated through the experiences of individuals. Where *The Knick* is explicit about eugenics' population-level motivations at the same time that it relegates them safely to the past, contemporary doctor shows recognise the social context that sterilisation operates within but refract the topic through emotional stories of individual suffering.

In two sterilisation stories set in more recent times (*Chicago Hope* S6E16 and *Chicago Med* S3E6), characters seek medical attention for an acute illness and their doctors incidentally discover that they had previously been sterilised without their knowledge. In *Chicago Hope* (2000), the patient, an older woman with a cognitive disability, breaks down at this revelation, crying 'someone didn't want anyone like me around' (S6E16, timestamp 13:34). It is initially unclear who performed the procedure and how long ago it had occurred, although they eventually identify the offending physician and are shocked when he shows no remorse for his actions. Although he claims the patient's mother begged him to perform the procedure (after the patient had turned 18) he employs social and economic arguments that recall *The Knick*'s twentieth-century logic to defend his actions:

Doctor Gray: We were doing that girl a service by preventing her from producing a child that she would be incapable of caring for. The

state of Illinois would have ended up raising that child, is that what you're in favor of?

Doctor Simon: A little social Darwinism?

Doctor Gray: You know what? I'd do it again. (Timestamp 19:34)

Later, the doctor who discovered that the patient had undergone tubal ligation without her consent brings the issue to her boss. The boss concedes that, in hindsight, the physician who performed the sterilisation was not acting in the patient's best interest. However, he adds, 'Was he really evil? Who are you to pass judgement on a colleague twenty years later? Are you so sure that 20 years from now some young surgeon won't find fault in a procedure you did?' (Timestamp 24:02). As the patient and her current physician, both women, grapple with the intuitive wrongness of the involuntary sterilisation, the men in hospital positions of authority respond defensively and without visible emotion. The moral relativism of the boss's defence dismisses the injustice the patient has suffered, but it raises a question pertinent to the audience. As new genetic technologies continue to emerge, will we look back on the 2000s as a time when 'things were different' (Timestamp 16:32).

In *Chicago Med* (S3E6), it is similarly revealed that a patient's mother had had her daughter sterilised under the guise of an appendectomy during her youth. After her troublesome daughter had repeated run-ins with the law, a judge told the mother that if she wanted to keep her daughter out of jail, she must have her tubes tied (S3E6, timestamp 18:33). The patient, who has always wanted children of her own, discovers her mother's deception when she suffers a ruptured appendix while on vacation in Chicago and must undergo emergency surgery. Her relationship with her mother is put to the test by the revelation of the role she played in the earlier involuntary sterilisation. Following this news, their doctor is appalled to learn that it was legal in North Carolina, where the patient is from, to sterilise women without their knowledge or consent until 1973.

In this story, the emotional toll of eugenics is illustrated by the strain that revelations of unconsented sterilisation create on characters' personal relationships. At the same time, *Chicago Med* draws attention to the way that bias around questions of crime, poverty, education and geography continue to motivate sterilisation efforts and compound their effects, even in the present day. The mother, who is from rural North Carolina and became pregnant when she was young and poor, explains why she consented to the procedure on her child's behalf at the urging of the judge: 'that was my life, and I didn't want to see my daughter turn out the same' (18:50). This explanation troubles the physicians, who had not sufficiently considered the pressures that beset poorly educated and economically disadvantaged women. When the doctors try to understand how the daughter, now an adult, never discovered the truth about the falsified appendectomy, they are met with a similar explanation: she did not have the financial means to visit a doctor. The scenario evokes the disparities that persist around reproductive decision-making along regional, economic and educational lines.

As Paul Lombardo demonstrates in *Three Generations, No Imbeciles: Eugenics, the Supreme Court, and Buck v. Bell*, the USA's troubled history with sterilisation is far more recent than some may realise. Many laws that allow parents or other third parties to consent to the sterilisation still exist (Lombardo 2022, 287). Voluntary sterilisation has been used as a bargaining chip in criminal plea deals as recently as 2018 (Lombardo 2022, 284). Further, prisons and migrant detention centres have reportedly authorised sterilisations as recently as 2020 (Lombardo 2022, 286). In Europe, disabled women are still being sterilised despite

bans on the practice (Hurtes 2023). In the USA, 31 states and Washington, DC still have laws allowing the forced sterilisation of disabled people. In this way, doctor shows like *Chicago Hope* and *Chicago Med* help to inform the public about the ongoing, modern consequences of sterilisation practices, particularly for vulnerable populations.

In an interesting contrast to these episodes, the first season of *Marcus Welby, MD* (1970) told the story of a man plagued by fear of inheriting the Huntington's disease gene. He deceives his doctor in an attempt to get a voluntary vasectomy, claiming he is motivated by the threat of overpopulation. 'It's something I've felt about very deeply for a very long time, Marc. Something that threatens all of us: overpopulation. If you had to live with these statistics, these figures, these indisputable facts, you'd realize that it's up to people like Abby and me *because* we're intelligent, because we're responsible, to do something and do it now' (S1E18, timestamp 2:57). Dr Welby tells the patient he won't perform the surgery on an 'intelligent man like you' without a signature from his wife granting him permission (S1E18, timestamp 3:31). He justifies his paternalism by invoking a eugenic duty to reproduce desirable traits. However, the patient's true motivations, which are notably personal and emotional, are eventually discovered and he does not get the procedure. Ironically, it is ultimately revealed that the patient probably does not carry the Huntington's gene after all.

Across these plotlines in *Marcus Welby, MD*, *Chicago Hope* and *Chicago Med*, sterilisation is characterised by the way it infringes on the right to reproductive freedom. Two characters are denied it when they are sterilised without their consent while the one person who seeks out the procedure voluntarily is turned down. Patient autonomy is violated in both scenarios. In contrast to *The Knick*, which highlights eugenics' problematic social motivations and implications but rarely shows its private and individual repercussions, *Chicago Hope* and *Chicago Med* foreground the emotional experiences of individual women as the victims of involuntary sterilisation—although the reasons why they were sterilised are eerily reminiscent of those portrayed in *The Knick* set a century earlier.

On the other hand, the only character in our data set who seeks voluntary sterilisation—and is refused—is a man (*Marcus Welby, M.D.* S1E18). Unlike the other cases presented in these episodes, he is driven to get a vasectomy by fear over how a known genetic risk may affect him and his family. Notably, he still attempts to conceal his true reasons for wanting the procedure. Rather than admit his worries about his own health and reproductive fitness to his wife or doctor, he defends his desire to be sterilised by invoking the social problem of overpopulation in an attempt to disguise his real concerns. His unwillingness to reveal his risk for Huntington's disease is representative of the negative stigma surrounding genetic diseases during this period (Furman and Clayton 2022, 45). When his physician ultimately refuses because of his own preoccupation with the eugenic matter of the average intelligence of the population, the patient is robbed of his right to make his own reproductive decisions. The episode does not engage explicitly with the social implications of Dr Welby's goal to encourage those with desirable traits to reproduce, but instead highlights the ensuing injustice on a smaller, individual scale. While the severity of the psychological impact of sterilisation is made clear in these plotlines, so are its reverberations into other aspects of the lives of those affected, such as their personal relationships or access to appropriate medical care. In doctor shows set in contemporary times, the emotional toll of sterilisation is emphasised as characters grapple with the ways that social attitudes and policies affect

them as individuals, rather than society at large. One thing unites all these series, though: their general disapproval of eugenics and its social motivations.

As new genetic reproductive technologies have emerged and raised controversy, contemporary medical dramas continue to tackle their personal impact but elide discussions of their population-level consequences. In contrast to sterilisation, the relationship between genetic screening and eugenics receives less focus. While this matter has remained contested since the development of prenatal testing, doctor shows engage with this debate by focusing on genetic screening's impact on individuals.

'I'm Not Saying We Can't Handle It, I'm Asking if We Should': contemporary reproductive decision-making

Characters in medical dramas struggle to make decisions about pursuing or forgoing genetic screening, both prenatally and as adults. In our data set, characters move forward with testing more often than they opt out, and these choices are motivated by a variety of factors, including fear, futility and reproductive decision-making. Of the named genetic conditions that are tested for in our data set, Huntington's disease is the most prevalent and is a topic in six episodes. Alzheimer's appears in two episodes, whereas the remaining rarer conditions (including DiGeorge syndrome, cardiomyopathy, Pelizaeus-Merzbacher disease and others) are each featured only once in our data set. Portrayals of genetic screening and the decisions that follow the delivery of test results are highly variable and dependent on the diagnosis or condition being tested for. Overwhelmingly, however, the practice of genetic screening is championed as an important avenue for promoting reproductive freedom and exercising individual choice—even in the case of choices we may disagree with. The motives for these choices, which are individual and unique, take moral priority over their social ramifications.

A representative example is the medical drama *Private Practice* (2007–2013), in which genetic screening is completely embedded in family dynamics, personal relationships, and the characters' dreams, desires and feelings. There is little mention, let alone preoccupation, with the population-level consequences of terminating a pregnancy following a genetic disease diagnosis from prenatal testing. Instead, the needs of the mother and the impact of genetic screening on her partner, community and faith are prioritised. The melodramatic conventions of the medical genre affect the emotional ways the series portrays genetics, eugenics and medical decision-making. By embedding bioethical controversy in the complex lives of fictional characters, doctor shows offer insight into genetic testing at its most subjective and personal.

Three episodes in our data set chronicle prenatal genetic screening for the purpose of making reproductive choices (*The Bold Ones: The New Doctors* S1E7, *Grey's Anatomy* S11E10, *Grey's Anatomy* S11E11). Others follow prospective parents as they consider testing themselves, sometimes in order to decide whether or not to have children of their own (*Marcus Welby, M.D.* S1E18, *Private Practice* S1E6, *Royal Pains* S7E3). Test results indicating the presence of a genetic disease or predisposition do not universally prompt a decision not to reproduce. In *Private Practice* (2007, S1E6), for example, a woman struggles with the decision to get tested for the Huntington's disease gene. When she ultimately undergoes screening and it is revealed that she is a carrier, the knowledge actually encourages the couple to have children sooner rather than later despite the wife's earlier preoccupation with burdening her family with her medical care should she develop the condition. Her husband explains that

they are willing to take the chance of passing the disease onto a child, because 'If everyone who has the gene wasn't born, I never would have met [my wife]' (37:00). Here, the characters assert the value of the life of a child potentially affected by Huntington's disease by asserting the value of their own affected lives. In doing so, they use their individual experience to discourage selecting against the Huntington's variant on the implicit principle that a life with the condition is worth living. This decision could be characterised as antieugenic, but the show does not frame it in those terms. Instead, the family's choice to have children despite a genetic diagnosis is portrayed as a personal and empowering exercise of reproductive freedom made possible by genetic screening. Without their test results, they would not have had children at all.

Similarly, in *The Bold Ones: The New Doctors* S1E7 (1969) a physician encourages a friend with a history of pregnancy complications to have an amniocentesis offered by a new and controversial genetic counselling programme being launched at their hospital. She is thrilled when the results of the test are negative, but the doctor later realises that the patient's husband is displaying symptoms of Huntington's. The baby will have a 50/50 chance of inheriting the disease, which, back when the show was aired, could not yet be detected by amniocentesis. The doctor tells the woman that she can terminate the pregnancy if she doesn't want to gamble on whether or not her child will eventually develop the condition, but the patient says she is hopeful for the future and decides to keep the pregnancy despite the risks (Timestamp 40:00).

Across episodes 10–11 of *Grey's Anatomy*'s eleventh season (2015), two of the show's main characters must grapple with a similarly difficult decision following a prenatal diagnosis. In 'The Bed's Too Big Without You' (S11E10), Dr April Kepner undergoes chorionic villus sampling to determine conclusively if her baby has osteogenesis imperfecta (OI) type 2 or type 3. While she remains optimistic that the results will show the less severe type 3, her husband, Dr Jackson Avery, wants to discuss what they will do in the event that the baby has the more complicated and often fatal type 2. While Jackson doesn't want that kind of life for his child—one where his bones will break if his parents touch him—April and her mother refuse to talk about termination and insist God won't give them a greater burden than they can bear. When April tells Jackson that, as doctors, they can handle a medically complex child, he pushes back: 'I'm not saying we can't handle it. I'm asking if we should' (Timestamp 27:23).

The story continues in the next episode (S11E11), in which it is revealed that their baby has the more severe OI type 2, and ultimately, they make the difficult decision to pursue an induction termination. This choice, while distressing to the parents and fraught within the context of April's religious faith, is portrayed by the show as ethical and more humane than carrying the baby to term. They are met with overwhelming support from their community of fellow doctors, who visit the hospital's chapel throughout the episode to light candles for them. Despite April's insistence that there could still be a medical miracle, she ultimately terminates the pregnancy.

This two-episode arc is typical of medical dramas set in contemporary times, which highlight the ways that prenatal genetic screening creates moral dilemmas in individuals' lives. The decision to terminate a pregnancy following a genetic diagnosis is not portrayed as having eugenic consequences on a population level—rather, its motivation and repercussions are depicted as extremely personal. April's crisis of faith following her baby's diagnosis, for example, highlights the ways that

genetic screening is ethically complex within the context of people's religious and personal lives. While April feels like she is failing God's test, her non-religious husband struggles with how to support her while holding onto his own belief that it would be wrong to bring a baby into the world only for it to suffer (S11E10). The episode follows the way this conflict strains their marriage, their relationships with their parents and in-laws, and their professional work. The show never implies that their decision has consequences outside of the context of their own and their family's lives, and it does not equate the choices they make about their pregnancy with eugenics or other social concerns, despite the fact that OI is caused by genetic variants. Their friends and fellow physicians do not suggest this connection either. It is worth noting, however, that few would dispute the medical seriousness of OI or challenge the suffering it causes. This shapes how the ethics of screening, treatment and termination are parsed on screen. Portrayals of reproductive decision-making following a prenatal diagnosis for conditions such as Down's syndrome, achondroplasia or deafness, for which there are strong patient communities and cultures and less certainty or consensus on the medical severity of the condition, could look very different. It is notable that these kinds of cases do not appear in our data set, and further scholarly inquiry into their portrayal in popular media is merited.

While contemporary medical dramas rarely express disapproval of the use of genetic screening, they caution against the application of genetic technology for other ends. Season 4 episode 16 of *Private Practice*, for example, depicts an ethical controversy over an experimental reproductive medicine procedure. A couple that had been struggling to get pregnant finds out that the baby they are carrying has hypoplastic left heart syndrome and will likely die within days of her birth. Having already done IVF three times and suffered two miscarriages, the mother has no eggs left and their current pregnancy came from their last embryo. They ask Dr Addison Montgomery, an expert in neonatal surgery and genetics, to remove their baby's ovaries, use hormones to rapidly mature them, and fertilise her eggs with donor sperm shortly after birth so that the woman can have another chance at motherhood. When Dr Montgomery considers performing the procedure, excusing it as experimental, another doctor at the practice is shocked: 'No. This is Nazi Germany. And Tuskegee. All rolled into one' (Timestamp 21:30). While this is more a reference to unethical human research practices than to eugenic ideology, the scene ends with a reflection that recurs throughout our data set and is often addressed to more explicitly eugenic pursuits: 'There are lines that we shouldn't cross' (Timestamp 22:09).

In *Chicago Hope* S5E12, a similar comparison is levelled against a couple trying to use assisted reproductive technology to conceive a child using the eggs and sperm of high-achieving donors, despite the fact that they themselves are both healthy, fertile and capable of having a baby on their own. The egg donor they choose was selected after she responded to an ad placed by the couple in the *Chicago Mensa Journal*. They have yet to settle on a sperm donor. Over the course of the episode, they consider an architect, a software tycoon, and even their fertility doctor: 'You're a bright, young, Harvard educated doctor. Plus, with you performing the procedure, the baby's genetic father would have an active part in the birth process' (12:38). He passes on their offer and takes the case to the hospital ethics committee, where another physician is quick with his evaluation of the situation, 'They sound like Nazis' (25:43). While the doctors make a distinction between standard applications of reproductive technology—such as screening for genetic disease—and requests like

the couple's that they believe go too far, they struggle to reach a consensus on the moral permissibility of selecting 'ideal' donors. A debate ensues:

Doctor Hancock: We already have the power to choose gender and screen for genetic predisposition, do we really want people to build their ideal offspring?

Doctor Cacaci: I, for one, applaud their instinct to breed as productively as possible. Why not use today's technology to hone the species?

Doctor Yeats: The Moraskie's aren't Nazis. We may not agree with their choices, but...

Doctor Wilkes: They're asking us to create some kind of super kid. I mean, it's a pipe dream. There's no damn way you can know how your kids will turn out. Anyone who thinks they can is kidding themselves.

Doctor Watters: The fact remains that what they want to do is perfectly legal.

Doctor Austin: It doesn't mean we have to support it.

Doctor McNeil: Can we cut through the crap? How is any of this different than these people adopting a kid?

Doctor Hancock: Because they didn't assemble that kid from some genetic catalogue. (Timestamp 25:51)

Although Doctor Cacaci's comment about honing the species is clearly eugenic in nature, the other doctor brushes it aside and focuses on the uncertainty of reproductive outcomes. The crux of their debate involves the ethics of creating designer babies. Ultimately, the committee concludes that the hospital is 'incapable of devising a moral litmus test without leaving itself vulnerable to inconsistency and contradiction' (Timestamp 26:56), but the couple's physician remains apprehensive about helping them move forward with their plan. He asks them why they want to have a child in the first place, to bring a prodigy into the world or to start a family? The husband responds, 'Can't we have both?' (Timestamp 36:45). It is worth noting that the parents' desire to have a gifted child is personal and self-centred; they are not motivated, at least not explicitly, by any concerns about improving the species.

In the end, the doctor suggests they pursue these goals with a different physician, and the couple leaves the hospital with the intention of doing just that (and, rather obtusely, asks the doctor to let them know if he ever changes his mind about donating his sperm) (Timestamp 37:13). In this storyline, the characters pre-empt the need for genetic screening by attempting to select ideal donor parents based on their profiles. They are not preoccupied with selecting against undesirable traits; rather, they want to use their resources to ensure their future child benefits from what they consider to be an advantageous genetic background. While they are motivated by an understandable personal drive to give their baby the best possible chance at a good life, other characters raise concerns about the ethical permissibility of their decisions.

The couple indulges in a kind of genetic essentialism by assuming qualities like education level and business aptitude are governed by biology, and the hospital ethics committee raises red flags about the potential for a slippery slope to unfold from this line of reasoning. While the possible development of designer baby technology is a clear social concern throughout the episode, the ethics committee also problematises the couples' personal reasoning and calls their desire to be parents into question, though they ultimately privilege individual choice and 'leave it to the conscience of the patient' (Timestamp 27:00). As one physician puts it—in sharp contrast to the paternalism displayed in the earlier *Marcus Welby, MD* episode—even if the couple is making a mistake, 'it would be *their* mistake' (Timestamp 30:11).

Even in this example of a use of genetic screening technology with potentially serious downstream social consequences, *Chicago Hope* does not challenge the acceptability of genetic screening itself. While the message is clear throughout our data set that there are a number of ethical lines that should not be crossed, genetic screening, at least as we currently employ it, is not considered to be one of those lines. Instead, medical dramas caution against theoretical future applications of it, such as designing ideal offspring. In doing so, they mark an important moral distinction between genetic screening as it is already being used in the real world, and genetic screening as we might imagine it one day being misused for eugenic ends.

Further, even when questionably applied or misappropriated, genetic screening is ultimately championed by medical dramas as a valuable tool for promoting individual freedom and reproductive autonomy. Part of upholding these principles is allowing patients to make their own decisions, even questionable ones. Some of the most compelling arguments against the use of assisted reproductive technology to conceive a genetically advantaged child in *Chicago Hope* are those that attack the couple's desires and ambitions, not their social repercussions. The characters' motivations for using genetic reproductive technology, which are often complex and deeply ambivalent, not the consequences of their choices, are what carry the primary moral weight in television medical dramas.

CONCLUSION

Medical dramas offer unique insights into the way popular media makes sense of genetic technology and the ethics of its applications. The popularity and accessibility of doctor shows creates an opportunity for fictional narrative to furnish public debate, and the genre's melodramatic realism enables lay audiences to engage with scientific advances and the controversies associated with them in probable and distinctly emotional ways. These formal features allow for nuanced, ambivalent portrayals of genetic screening's contested relationship to eugenics in the past and present. Overwhelmingly, the genre does not equate the two.

Medical dramas are resolute in their disapproval of eugenics. From the twentieth-century history lessons of *The Knick* to stories about involuntary sterilisation set in hospitals today, doctor shows problematise the ways that eugenic attitudes infringe on reproductive freedom along economic, racial, regional and other social lines. At the same time, medical dramas champion genetic screening as a way to promote choice and protect the reproductive freedom of individuals. In doing so, doctor shows draw a moral contrast between the unjust population-level consequences of eugenics, and the subjective and affective implications of genetic screening in the personal lives of patients and their families.

Twitter Jay Clayton @Cheeryble2

Acknowledgements The authors thank Lauren Furman for her contribution to collecting data on TV medical shows from 1961 to 2020 and for identifying episodes with genetic content. The authors also thank their colleagues in the Center for Genetics and Identity in Community Settings at Vanderbilt University and Vanderbilt University Medical School for their collegial support and Ellen Wright Clayton for reading and commenting on an earlier version of this article.

Contributors AE: Conceptualisation, Data curation, Analysis, Methodology, Writing of the original draft, Writing of the review and editing. JC: Conceptualisation, Analysis, Methodology, Writing of the original draft, Writing of the review and editing, Guarantor.

Funding U.S Department of Health and Human Services, National Institutes of Health, National Human Genome Research Institute, 5RM1HG009034.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Ayden Eilmus <http://orcid.org/0000-0003-0146-4678>

Jay Clayton <http://orcid.org/0000-0002-3569-4853>

NOTES

1. For an account of current reproductive genetic screening procedures, see Leonard (2021). <https://pubmed.ncbi.nlm.nih.gov/34448384/>.
2. The portrayal of disability and genetic disorders in doctor shows is an area of study that merits scholarly exploration in its own right (Hall and Minnes 1999, 61).
3. There were six more episodes coded for eugenics in *The Knick*, a historical medical drama set in the early twentieth century.

BIBLIOGRAPHY

- Asbeek Brusse, E. D., M. L. Fransen, and E. G. Smit. 2015. "Educational Storylines in Entertainment Television: Audience Reactions toward Persuasive Strategies in Medical Dramas." *Journal of Health Communication* 20 (4): 396–405.
- Berger, E. 2010. "From Dr. Kildare to Grey's Anatomy." *Annals of Emergency Medicine* 56 (3): A21–23.
- Bull, S. 2014. Tracing Bloodlines: Kinship and Reproduction under Investigation in CSI: Crime Scene Investigation. *Journal of Popular Television, The* 2 (2): 117–37.
- Bull, S. 2019. "Television and the Genetic Imaginary." In *Television and the Genetic Imaginary*. London: Palgrave Macmillan.
- Clayton, E. W. 2021. "With Legal Challenges to Abortion, Whither Prenatal Diagnosis?" The Hastings Center. Available from: <https://www.thehastingscenter.org/with-legal-challenges-to-abortion-whither-prenatal-diagnosis/>
- Davin, S. 2000. "Medical Dramas as a Health Promotion Resource—an Exploratory Study." *International Journal of Health Promotion and Education* 38 (3): 109–12.
- Denworth, L. 2014. "Deaf Culture and Cochlear Implants: Genocide or Salvation?" *Time*. <https://time.com/76154/deaf-culture-cochlear-implants/>.
- Dillender, K. 2018. "Not Your Average Ancestry: Genetic Testing and Family Identities in Orphan Black." *Science Fiction Film and Television* 11 (3): 406–10.
- Domaradzki, J. 2021. "Popular Culture and Genetics: Genetics and Biotechnologies in the Movies." *Polish Sociological Review* 215 (3): 281–310.
- Don't Screen Us Out. "Home." Don't Screen Us Out. Available from: <https://donscreensusout.org/>. Accessed 3 Dec 2023.
- Duster, T. 1990. *Backdoor to Eugenics*. New York: Routledge.
- Epstein, S. Sechet. 2016. "The Surgeon Behind The Knick: Interview with Dr. Burns." *Sloan Science & Film*. <https://scienceandfilm.org/articles/2707/the-surgeon-behind-the-knick-interview-with-dr-burns>.
- Franklin, S., and C. Roberts. 2006. "Born and Made." In *Born and Made: An Ethnography of Preimplantation Genetic Diagnosis*. Princeton: Princeton University Press.
- Furman, L., and J. Clayton. 2022. "Genetics in Television Medical Dramas." *Journal of Literature and Science* 14 (1/2): 39–56.
- Gaventa, B., D. Stahl, and K. McDonald. 2020. "Public Health Ethics and Disability: Centering Disability Justice." *Public Health Perspectives on Disability*: 129–48.
- Genome.Gov. "Eugenics and Scientific Racism." Genome.Gov. Available from: <https://www.genome.gov/about-genomics/fact-sheets/Eugenics-and-Scientific-Racism>. Accessed 3 Dec 2023.
- Gibbons, E., I. Stovall, and J. Clayton. 2021. "Genetics in Film and TV, 1912–2020." *Journal of Literature and Science* 14, no. 1/2: 1–22.
- Grimsted, S. R., K. G. Krizner, C. D. Porter, and J. Clayton. 2024. "Genetics in the X-Men Film Franchise: Mutants as Allegories of Difference." *Frontiers in Genetics* 14: 1331905.
- Hall, H., and P. Minnes. 1999. "Attitudes Toward Persons with Down Syndrome: The Impact of Television." *Journal of Developmental and Physical Disabilities* 11 (1): 61–76.
- Hamner, E. 2017. "Editing the Soul." In *Editing the Soul: Science and Fiction in the Genome Age*. Basel/Berlin/Boston: Pennsylvania State University Press.
- Haran, J., J. Kitzinger, M. McNeil, and K. O'Riordan. 2007. "Human Cloning in the Media." In *Human Cloning in the Media*. London: Routledge.

- Haran, J., and K. O'Riordan. 2017. "Public Knowledge-Making and the Media: Genes, Genetics, Cloning and Mass Observation." *European Journal of Cultural Studies* 21 (6): 687–706.
- Hether, H. J., G. C. Huang, V. Beck, S. T. Murphy, and T. W. Valente. 2008. "Entertainment-Education in a Media-Saturated Environment: Examining the Impact of Single and Multiple Exposures to Breast Cancer Storylines on Two Popular Medical Dramas." *Journal of Health Communication* 13 (8): 808–23.
- Hoffman, B. L., A. Shensa, C. Wessel, R. Hoffman, and B. A. Primack. 2017. "Exposure to Fictional Medical Television and Health: A Systematic Review." *Health Education Research* 32 (2): 107–23.
- Hurtes, S. 2023. "Despite Bans, Disabled Women Are Still Being Sterilized in Europe." *The New York Times*. <https://www.nytimes.com/2023/11/25/world/europe/europe-disabled-women-sterilization.html>.
- Jacobs, J. 2003. *Body Trauma TV: The New Hospital Dramas*. London: British Film Inst.
- Kevles, D. J. 1995. *In the Name of Eugenics: Genetics and the Uses of Human Heredity*. Cambridge, MA: Harvard University Press.
- Kirby, D. A. 2007. "The Devil in Our DNA: A Brief History of Eugenics in Science Fiction Films." *Literature and Medicine* 26 (1): 83–108.
- Knight, A., and J. Miller. 2021. "Prenatal Genetic Screening, Epistemic Justice, and Reproductive Autonomy." *Hypatia* 36 (1): 1–21.
- Leonard, S. J. 2021. "Reproductive Genetic Screening for Information: Evolving Paradigms?" *Journal of Perinatal Medicine* 49 (8): 998–1002.
- Lieberman, J. L. 2018. "Infertility and Parenthood in Orphan Black." *Science Fiction Film and Television* 11 (3): 401–5.
- Lombardo, P. A. 2022. *Three Generations, No Imbeciles: Eugenics, the Supreme Court, and Buck v. Bell*. Baltimore, MD: Johns Hopkins University Press.
- Morgan, S. E., L. Mavius, and M. J. Cody. 2009. "The Power of Narratives: The Effect of Entertainment Television Organ Donation Storylines on the Attitudes, Knowledge, and Behaviors of Donors and Nondonors." *Journal of Communication* 59 (1): 135–51.
- National Women's Law Center. 2023. "Forced Sterilization of Disabled People in the United States." National Women's Law Center. Available from: <https://nwlc.org/resource/forced-sterilization-of-disabled-people-in-the-united-states/>
- Navon, D. 2020. "The Gene Didn't Get the Memo': Realigning Disciplines and Remaking Illness in Genomic Medicine." *Critical Inquiry* 46 (4): 867–90.
- Oliver, K. H., S. Higgs, and J. Clayton. 2021. "The End of Genetic Privacy in the Blade Runner Canon." *Journal of Literature and Science* 14 (1–2): 108–24. <https://doi.org/10.12929/jls.14.1-2.08>.
- O'Riordan, K. 2008. "Human Cloning in Film: Horror, Ambivalence, Hope." *Science as Culture* 17 (2): 145–62.
- O'Riordan, K. 2020. *Genome Incorporated: Constructing Biodigital Identity*. Routledge.
- Parens, E., and A. Asch. 1999. "The Disability Rights Critique of Prenatal Genetic Testing. Reflections and Recommendations." *The Hastings Center Report* 29 (5): S1–22.
- Perez Gomez, J. 2020. "When Is the Promotion of Prenatal Testing for Selective Abortion Wrong?" *Kennedy Institute of Ethics Journal* 30 (1): 71–109.
- Quick, B. L. 2009. "The Effects of Viewing *Grey's Anatomy* on Perceptions of Doctors and Patient Satisfaction." *Journal of Broadcasting & Electronic Media* 53 (1): 38–55.
- Rapp, R. 2000. *Testing Women, Testing the Fetus: The Social Impact of Amniocentesis in America*. New York: Routledge.
- Ravitsky, V. 2017. "The Shifting Landscape of Prenatal Testing: Between Reproductive Autonomy and Public Health." *The Hastings Center Report* 47 Suppl 3 (S3): S34–40.
- Rocchi, M. 2019. "History, Analysis and Anthropology of Medical Dramas: A Literature Review." *Cinergie – Il Cinema e Le Altre Arti* 8 (15): 69–84. <https://doi.org/10.6092/issn.2280-9481/8982>.
- Shakespeare, T. 1998. "Choices and Rights: Eugenics, Genetics and Disability Equality." *Disability & Society* 13 (5): 665–81.
- Stacey, J. 2010. "The Cinematic Life of the Gene." In *The Cinematic Life of the Gene*. Durham, NC: Duke University Press.
- Taylor, T., and C. S. King. 2022. "Monstrous Proletariat: The Racial Chimera in District 9 and Sorry to Bother You." *Journal of Literature and Science* 14: 1–2. <https://doi.org/10.12929/jls.14.1-2.06>.
- Thomas, G. M., and B. K. Rothman. 2016. "Keeping the Backdoor to Eugenics Ajar?: Disability and the Future of Prenatal Screening." *AMA Journal of Ethics* 18 (4): 406–15.