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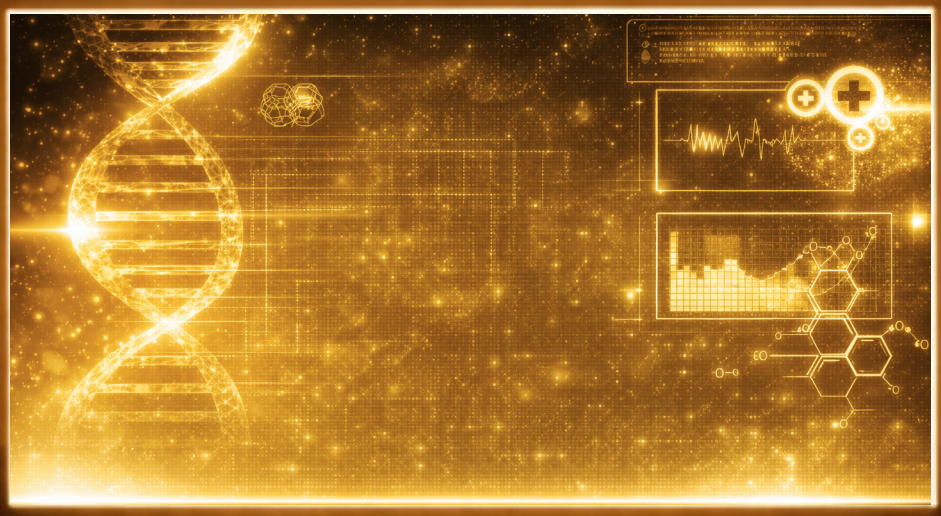
The Future is Now



Formative Research on Representations of the Future of Medicine in Scripted Entertainment

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SCCTSI SOUTHERN CALIFORNIA CLINICAL AND TRANSLATIONAL SCIENCE INSTITUTE
Translating Science into Solutions for Better Health

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About the Norman Lear Center
The Norman Lear Center is a nonpartisan research and public policy center that studies the social, political, economic, and cultural impact of entertainment. The Lear Center helps bridge the gap between the entertainment industry and academia, and between them and the public. Through its scholarship, research and partnerships; its events, publications and outreach to the creative community; and its role in formulating the field of entertainment studies, the Norman Lear Center works to be at the forefront of discussion and practice – and to illuminate and repair the world.

At the Lear Center's **Media Impact Project**, we study the impact of news and entertainment on viewers. Our goal is to prove that media matters, and to improve the quality of media to serve the public good. We partner with media makers and funders to create and conduct program evaluation, develop and test research hypotheses, and publish and promote thought leadership on the role of media in social change.

EXECUTIVE SUMMARY

Popular media reflects and shapes ways in which audiences understand health, science, and medicine. Since 2018, the Southern California Clinical and Translational Science Institute (SC CTSI) has partnered with the Norman Lear Center's Hollywood, Health & Society (HH&S) program to engage the U.S. entertainment industry around the *future of medicine,* including medical research and cutting-edge technologies.

In 2022, SC CTSI renewed its support of HH&S, alongside formative research by the Center's Media Impact Project (MIP) to understand the landscape and inform these outreach strategies. This formative research has included:

- **Interviews** with experts and entertainment insiders
- A **Frequency analysis** of *future of medicine* keywords in English- and Spanish-language scripted entertainment
- An **in-depth content analysis** of clinical trials in English-language scripted TV and film

Key Findings

COMMUNITY NEEDS AND REPRESENTATION CHALLENGES:

- Top issues mentioned by interviewed community health/medical experts included mental health, chronic health conditions, and violence.
- Experts emphasized trust of healthcare providers and different rates of utilization of healthcare services as issues that would facilitate the uptake of cutting-edge medical research, techniques, and technologies.
- Interviewed TV writers and creatives were interested in new angles to tell more stories about cutting-edge medical issues as long as they fit in their shows storyworlds.
- Articulated barriers to more storytelling about the future of medicine included perceived controversiality or negativity of the issues and less creative control held by the writers.

FUTURE OF MEDICINE MENTIONS (ENGLISH-LANGUAGE CONTENT):

- We identified 2,542 mentions of 41 *future of medicine* keywords in 1,310 scripted TV episodes and films between 2016 and 2022.
- From 2016 to 2020, only 2.3% of TV and film scripts mentioned at least one keyword. This increased to 3.6% in 2021 before nearly returning to baseline at 2.6% in 2022.
- The most frequently mentioned keywords were "clinical trial," "stem cell," and "new drug," each of which had more than 300 mentions.
- The vast majority (89%) of keyword mentions appeared in dramas. Seven percent were in comedies and 4% in comedy-dramas.

FUTURE OF MEDICINE MENTIONS (SPANISH-LANGUAGE CONTENT):

- Over a one-year period, we identified 179 mentions of 10 Spanish-language *future of medicine* keywords in scripted broadcast content, with 77 mentions of 16 keywords in original Netflix content.
- The most mentioned keywords on broadcast were “inteligencia artificial” (artificial intelligence) and vacuna (vaccine). On Netflix, the most mentioned keywords were “farmacéutico” (pharmaceutical), “vacuna” (vaccine), and “ensayos clínicos” (clinical trial).
- On broadcast, the drama series *Como Dice El Dicho* led the way with 32 keyword mentions. On Netflix, the most mentions appeared in the telenovela *Madre de Alquiler (The Surrogacy)*, which centered on a scandalized clinical trial that caused harm to infants.

PORTRAYALS OF CLINICAL TRIALS:

- While clinical trials were mostly portrayed as trustworthy, a substantial minority included unethical practices, staffers lying or withholding information, patients being harmed, or unfair selection procedures.
- The majority of clinical trial patients were white.
- Informed consent was not always evident.
- The majority of clinical trial staffers were portrayed in a positive light.

Recommendations for Storytellers, Advocates & Funders

1. **Portray innovative medical advances in a way that fits seamlessly into the story world.**
2. **Highlight less visible advances in medicine like cell therapy, medical devices, precision medicine, and regenerative medicine.**
3. **Be conscious of portraying clinical trials as untrustworthy, unethical, or even harmful.**
4. **Encourage learning about clinical trials through calls to action, including PSAs.**
5. **Engage expert consultants to ensure medical advances and clinical trials are portrayed with accuracy and fidelity.**
6. **Support research into audience demand for — as well as the reach and impact of — stories that address the *future of medicine*.**

INTRODUCTION

Community trust in medicine broadly and in medical research specifically are vital factors that underpin public health. Higher trust in medicine is associated with better health outcomes, increased engagement with healthcare systems, and advanced scientific progress.[1] Yet research shows public trust in science and medicine has been declining.[2] Nationwide, several programs and organizations are focused on community trust in medicine.

Supported by the NIH Clinical and Translational Science Awards (CTSA) Program and in partnership with the Los Angeles County Department of Health Services and community health organizations throughout Los Angeles, the Southern California Clinical and Translational Science Institute (SC CTSI) engages communities in clinical and translational research to improve their health. In their work, SC CTSI focuses on urban and rural communities within several regions within the United States:

- **Northeast** (e.g., New York)
- **West** (e.g., Washington)
- **Midwest** (e.g., Illinois)
- **Southwest** (e.g., New Mexico)

SC CTSI is broadly interested in translating science to solutions in the context of *the future of medicine* or cutting-edge techniques and technologies that are likely to play a large role in medicine. SC CTSI-identified priority health and medical issues ("priority issues") in connection to the *future of medicine* include: gene therapy, clinical trials, stem cell therapy, biotechnology, messaging around medicine, precision therapy, genetic therapy, gene sequencing, telehealth, AI in medicine.

Medical research is key to facilitating the future of medicine. Clinical trials specifically are an essential tool for developing safe medical technologies and interventions that advance healthcare in the United States. However, there is confusing messaging from multiple sources surrounding clinical trials, which can result in a lack of trust, particularly in communities that have less access to health and medicine.[3]

Extensive research shows that scripted TV and movies play a powerful role in influencing audiences' perceptions, knowledge, and behaviors around medicine and healthcare.[4] Given this persuasive power, in 2018

1 John, M., Kloyer, M. & Fleßa, S. (2023). Sustaining medical research – the role of trust and control. *Health Econ Rev 13*, 33. https://doi.org/10.1186/s13561-023-00445-8

2 Perlis, R.H., Ognyanova, K., Uslu, A., et al. (2024). Trust in Physicians and Hospitals During the COVID-19 Pandemic in a 50-State Survey of US Adults. *JAMA Network Open, 7*(7). https://doi.org/10.1001/jamanetworkopen.2024.24984

3 Ford J.G., Howerton M.W., Lai G.Y., et al. (2008). Barriers to recruiting underrepresented populations to cancer clinical trials: a systematic review. *Cancer: Interdisciplinary international journal of the American cancer society, 112*(2), 228-242. https://doi.org/10.1002/cncr.23157
Hashem, H., Abufaraj, M., Tbakhi, A., et al. (2020). Obstacles and considerations related to clinical trial research during the COVID-19 pandemic. *Frontiers in Medicine*, *7*. https://10.3389/fmed.2020.598038
Hoberman, J. (2012). *Black and Blue: The origins and consequences of medical racism*. California: UC Press.

4 Korobkova, K., Weinstein, D., Felt, L., Rosenthal, E., Blakley, J. (2023). Lights, Camera, Impact: 20 Years of Research on the Power of Entertainment to Support Narrative Change. USC Norman Lear Center Media Impact Project. https://learcenter.s3.us-west-1.amazonaws.com/NormanLearCenter-Narrative-Change-Research-Review.pdf

Extensive research shows that scripted TV and movies play a powerful role in influencing audiences' perceptions, knowledge, and behaviors around medicine and healthcare.

the Southern California Clinical and Translational Science Institute (SC CTSI) began a partnership with the Norman Lear Center's Hollywood, Health & Society (HH&S) program to engage the U.S. entertainment industry and inspire storylines addressing the future of medicine. In 2022, SC CTSI renewed its support of HH&S for another five years, including topics such as medical research and cutting-edge technologies.

Because there is little existing research on how medical advances and research, including clinical trials, are represented in scripted entertainment,[5] SC CTSI engaged the Lear Center's Media Impact Project (MIP) to conduct formative research to better understand the landscape and inform HH&S outreach strategies. This formative research has included the following:

- **Interviews** with experts and entertainment insiders to:
    a. Understand the medical/health-related issues faced by communities and *future of medicine* issues in key regions;
    b. Explore the challenges and opportunities of telling stories about those issues in popular television;

- A **frequency analysis** to establish a baseline for mentions of the *future of medicine* in English- and Spanish-language scripted entertainment;

- An **in-depth content analysis** of clinical trials in scripted TV and film to understand whether they are portrayed as trustworthy and document the demographics of staff and patients.

5 Fisher, J. A., & Cottingham, M. D. (2016). This isn't going to end well: Fictional representations of medical research in television and film. *Public Understanding of Science, 26*(5), 564-578. https://doi.org/10.1177/0963662516641339

COMMUNITY NEEDS AND REPRESENTATION CHALLENGES

Methods

We conducted in-depth interviews with **19 participants**: 9 health/medicine experts and 10 entertainment insiders (TV writers and producers, mostly from medical shows). Health experts were identified by SC CTSI. Entertainment industry participants were identified and recruited with the support of Hollywood, Health & Society.

- **Health/medicine experts** in the four geographic areas (Northeast; West; South; Midwest): To better understand the pressing medical and health-related issues in the communities in these regions, we asked about:
  - Pressing health and medicine-related issues
  - Public trust in medicine
  - The impact of public health emergencies
  - Ways in which cutting edge medical issues and technologies are discussed
  - Helpful and unhelpful portrayals of pressing issues in entertainment media

- **Entertainment insiders:** To learn about opportunities and challenges to storytelling about health and medical issues seen as pressing by the interviewed experts, we asked about:
  - Medical and health-related themes and issues they have or are writing about on scripted television;
  - Medical and health-related themes and issues they think are important to tell stories about;
  - Current and future stories related to the particular cutting-edge medical issues and technologies of interest; and
  - Challenges and opportunities for medicine- and health-related storytelling around the discussed issues.

Table 1.
Most Frequently Mentioned Issues

9 EXPERTS INTERVIEWED	
Mental health	6 experts
Diabetes	4 experts
Violence	3 experts
Public health emergencies	3 experts
Maternal health	3 experts
Obesity	2 experts
Aging	2 experts
Cancer	2 experts

Key Findings: Health and Medicine Experts

PRESSING ISSUES IN COMMUNITIES

Interviewed medical experts from various regions discussed multiple pressing issues in the communities they serve. Some issues came up frequently, with mental health and diabetes mentioned by about half of the interviewed experts.

PRIORITY ISSUES ASSOCIATED WITH *THE FUTURE OF MEDICINE*

Across regions, experts emphasized issues of medical access, supporting communities with histories of little medical access, and trust within their communities as *precursors* to discussions of cutting edge future-facing medical techniques and technologies.

Experts discussed issues of trust in medicine as related to **accessibility to medicine**, both logistical and cultural.

- **Logistically**, communities with historically sparse access to the medical system could not afford care or, at times, reliable transportation to care. In the West, experts articulated the need for clear rules around data privacy, as community members worried about confidentiality in connection to clinical trial participation.
- **Culturally**, we heard about some communities that faced language barriers and lack of community-facing public health representatives and physicians that came from the communities. Also, known histories of extraction and mistreatment have eroded trust in medical research in certain communities, according to interviews.

Aside from issues related to culture, access, and logistics, experts discussed some of the identified *future of medicine* issues and technologies, including:

- clinical trials
- AI
- mRNA technologies
- gene therapy
- telehealth
- information shared via social media networks.

The discussion of therapeutic applications of clinical trials, AI, mRNA, and gene therapy would be facilitated by more public access, more trust, and more outreach in the community, according to interviewed experts.

Key Findings: Entertainment Insiders

HEALTH AND MEDICINE ISSUES IN ENTERTAINMENT

In their current and past television storytelling, interviewed writers and producers covered a range of health and medical issues, including obesity, diabetes, breast cancer, mental health and maternal mortality and profit in the medical system.

Most of the interviewed creatives worked on medical shows and were interested in new angles and real life stories on topics that could further the story arc of the current season or one of the main characters.

When we asked about **issues connected to *the future of medicine*** or cutting edge technologies, we found that health issues they've written about included: gene therapy, clinical trials, telehealth, robots, and AI in

Many of the interviewed writers shared a common vision with the interviewed health/ medical experts by wanting to emphasize the ways in which access to medical care has not been equally distributed.

medicine. The fit between the issue or technology and the show's storyworld was emphasized, as interviews explained that gene therapy is less likely to appear on surgery-focused shows as those technologies prevent the need for surgery. Similarly, the writers saw most current and future AI-focused storylines as being framed negatively, in part because there is a 'hero doctor' vs. 'evil AI' trope that can fit neatly into most of the current medical show worlds.

Many of the interviewed writers shared a common vision with the interviewed health/medical experts by wanting to emphasize the ways in which access to medical care has not been equally distributed. The head writers and producers on established shows and those on streaming platforms conveyed that their executives were willing to tolerate more risk, which might lead to their shows airing more stories about access to healthcare in the future. On the other hand, those with shows on broadcast networks or newer TV shows perceived their decision makers as more risk-averse, preferring content with mass appeal and going to lengths to avoid negative reactions on social media.

BARRIERS AND OPPORTUNITIES

Interviewed writers and producers discussed particular barriers and opportunities in health and medical storytelling:

Barriers to health and medicine storytelling included:

- Perceived controversiality of issues by decision-makers (showrunners, executives)
- Aversion to stories perceived as too negative or unrelated to the show
- Ongoing vertical integration of broadcasting networks or a strategy where broadcasters increasingly control all stages of the production and distribution processes

Writers saw the ongoing integration of broadcasting networks as leaving less room for their voice in decision making. For example, despite interest in writing stories about public health emergencies, interviewees foresaw little likelihood of having these stories greenlit, because executives perceive there is audience fatigue around these issues.

Opportunities for health and medicine storytelling included:

- Openness to including stories about cutting-edge therapies in line with shows' storyworlds
- Desire to tell more stories about access to healthcare
- A sense that issue-based advice from advocacy and outreach organizations is useful in responsible storytelling

In particular, producers and writers were enthusiastic to learn about real-world developments in cutting-edge medical technology and appreciated the guidance on how to tell these stories responsibly and effectively, as long as they fit naturally within their show's narrative universe.

FUTURE OF MEDICINE MENTIONS IN ENGLISH-LANGUAGE SCRIPTED ENTERTAINMENT

Methods

Through a literature review and consultation with scientific and medical experts, we generated an initial list of 82 keywords and terms related to the *future of medicine* (e.g., "stem cell," "clinical trial," "gene therapy"). All potential keywords were tested for relevance and visibility in the Norman Lear Center Script Database, a repository of transcripts from over 132,000 scripted TV episodes across broadcast, cable, and streaming, and more than 35,000 films. After removing keywords with no mentions and those that were largely not relevant to the *future of medicine*, we retained 41 keywords for analysis.

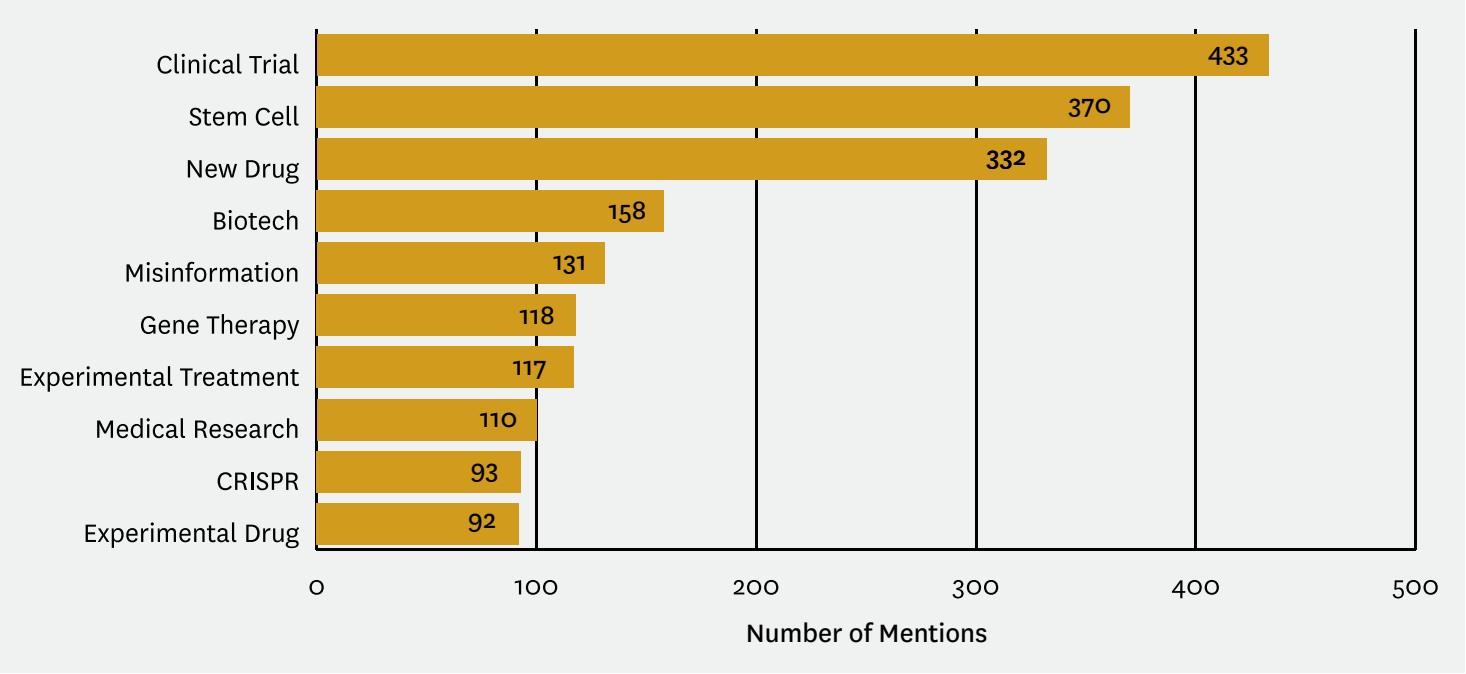
To establish a baseline for representation of the *future of medicine* in scripted TV and film, we used the Norman Lear Center Script Database to query all mentions of the 41 keywords from 2016-2022 (a total of 53,508 scripts). We analyzed:

- For each keyword: The number of mentions and number of scripts with any mentions.
- For each mention: Year, genre and subgenre, network, and viewership/box office totals.

Key Findings

Figure 1.

Most Mentioned Keywords in English-Language Content

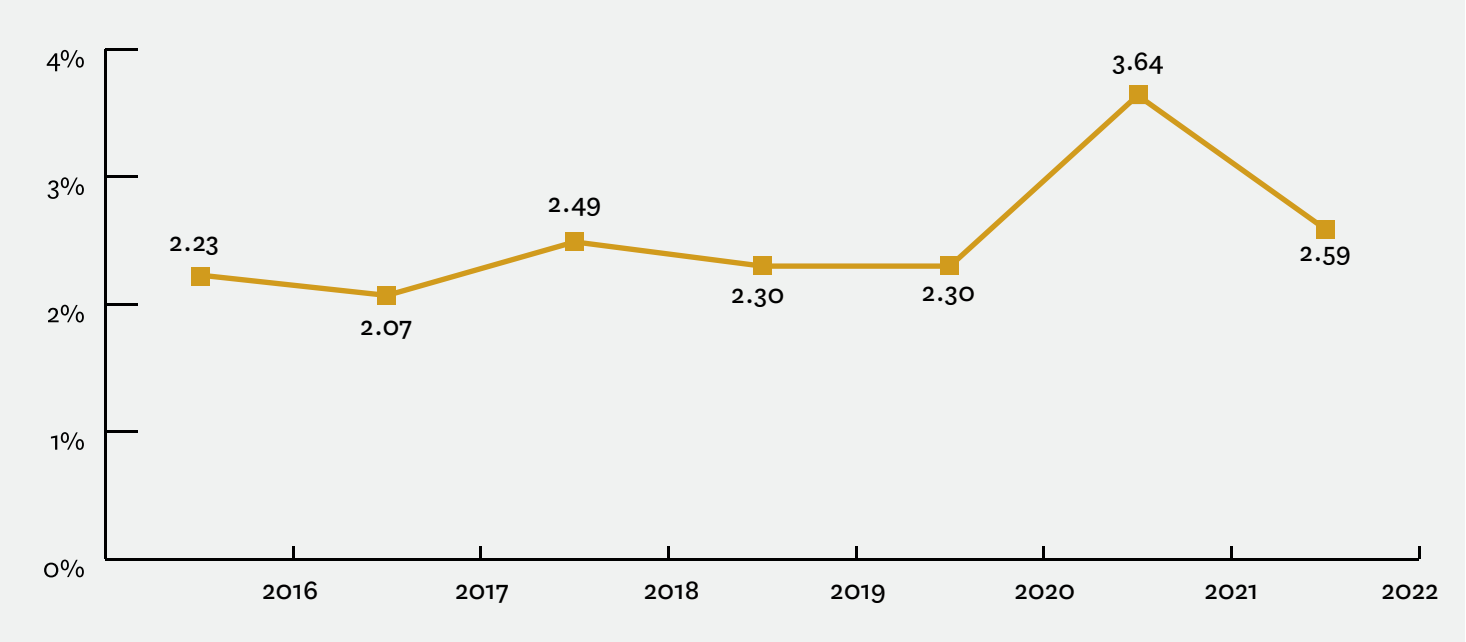


Only 2.45% of scripts had one or more keyword mentions.

- We identified 2,542 mentions of *future of medicine* keywords in 1,310 scripts (out of 53,508 scripts queried).
- The most frequently mentioned keyword was "clinical trial," which accounted for 17% of all keyword mentions. "Stem cell" and "new drug" rounded out the top three.
- The top ten keywords accounted for more than 75% of all keyword mentions.

Figure 2.

Percentage of Episodes with English-Language Keyword Mentions



Mentions of *future of medicine* keywords peaked in 2021, with 3.64% of all episodes mentioning one or more keywords.

- Between 2016 and 2020, 2.28% of scripts included at least one mention of a *future of medicine* keyword.
- This increased to 3.64% in 2021 before nearly returning to baseline at 2.59% in 2022.

The vast majority (89%) of *future of medicine* keyword mentions appeared in dramas.

- The most common genres to feature keywords were medical dramas and sci-fi/fantasy, followed by crime/legal, action/adventure, and thriller.
- Only 7% of keyword mentions were in comedies and 4% in comedy-dramas.

TV shows that mentioned future of medicine keywords were viewed over 3 billion times.[6]

- Keywords were mentioned in 18 episodes of ten shows that had over 9 million viewers each, including *The Big Bang Theory* ("neural network"), *NCIS* ("experimental treatment," "biotech," "surgical robots"), and *Bull* ("clinical trial," "new drug," "cutting edge medicine").

6 Views are calculated by multiplying the number of mentions in an episode by the number of viewers. so if an episode of TV has 1 million viewers and 5 mentions of a keyword, it counts as 5 million views. We were able to identify viewership data associated with 67% of keyword mentions.

Figure 3.

English-Language Keyword Mentions by Genre

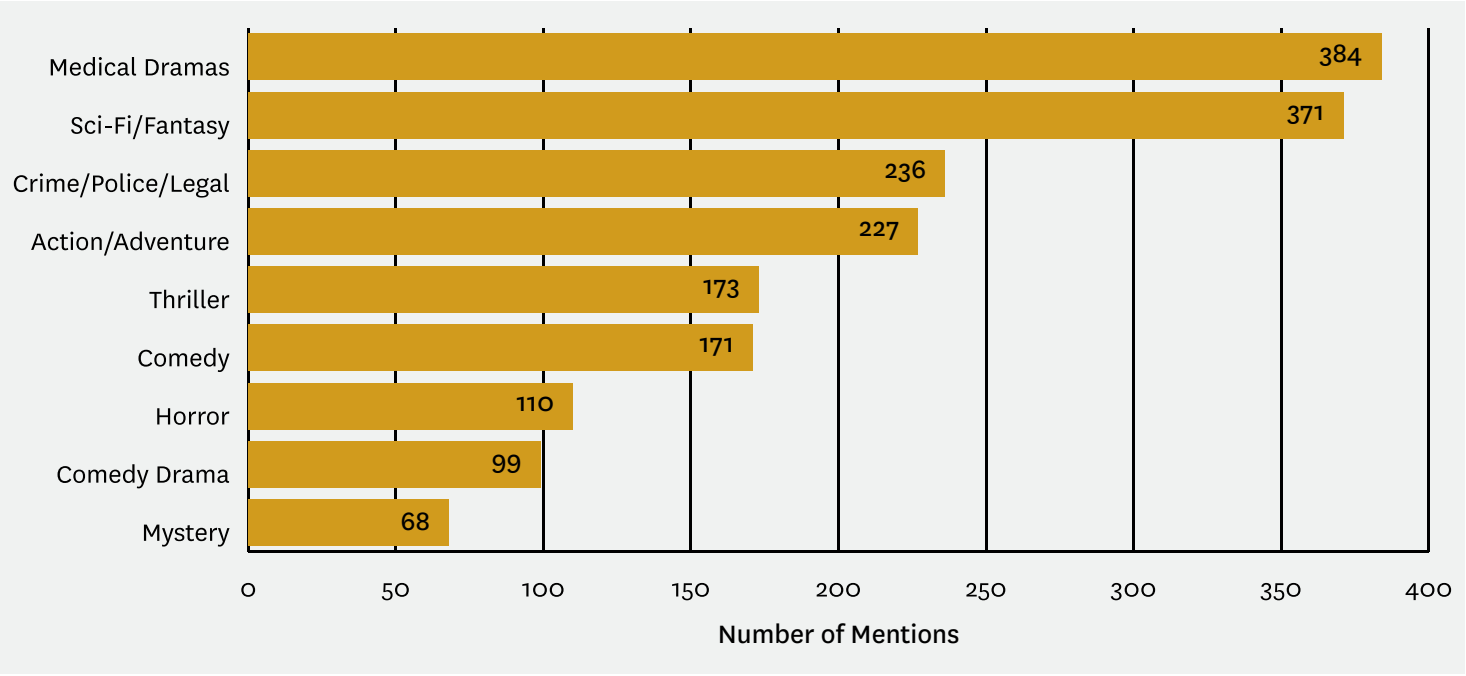


Table 2.

Most Watched TV Episodes with English-Language Keyword Mentions

Episode	Keyword(s)	Viewers per Episode (Millions)
Big Bang Theory	neural network	14.47 (1 episode)
NCIS	experimental treatment, biotech, surgical robots	12.08 - 14.16 (4 episodes)
FBI	disinformation	10.67 (1 episode)
Bull	clinical trial, new drug, cutting edge medicine	10.34 - 10.61 (3 episodes)
The Good Doctor	experimental treatment, medical device	9.25 - 10.60 (2 episodes)
This Is Us	experimental drug	9.35 (1 episode)
NCIS New Orleans	clinical trial, new drug	9.22 - 9.30 (2 episodes)
NCIS Hawaii	stem cell	9.22 (1 episode)
Castle	disinformation, new drug	9.10 (2 episodes)
Madam Secretary	neural network	9.00 (1 episode)

Films that mentioned future of medicine keywords earned over $9 billion at the box office..[7]

- The movies with the highest box office totals included *Venom* (gene therapy), *Deadpool* (experimental drug, new drug), and *Doctor Strange* (new procedure, stem cell).
- The highest grossing film to mention clinical trials was *Pokemon: Detective Pikachu*.

Table 3.

Top Grossing Movies with English-Language Keyword Mentions

Movie	Keyword(s)	Box Office
Venom	gene therapy	$856 million
Deadpool	experimental drug, new drug	$782 million
Doctor Strange	new procedure, stem cell	$677 million
Logan	gene therapy, stem cell	$619 million
The Secret Life of Pets 2	medical device	$446 million
Pokemon Detective Pikachu	clinical trial	$433 million
Rampage	CRISPR	$428 million
The Sky Is Pink	stem cell	$344 million
Ford vs. Ferrari	misinformation	$225 million

NBC, CBS, and Netflix had the most mentions of *future of medicine* keywords as well as the most unique episodes that included any mentions.

- *The Resident* (FOX), *Chicago Med* (NBC), *The Imperfects* (Netflix), *Grey's Anatomy* (ABC), and *Blindspot* (NBC) each had over 50 mentions of *future of medicine* keywords.

7 Box office is calculated by multiplying the number of mentions in a movie by its box office earnings. So if a movie earned $10 million and it had 5 mentions of a keyword, it counts as $50 million. Box office totals were available for 117 of the 308 movies that included future of medicine mentions.

Figure 4.

Networks/Platforms with Most English-Language Keyword Mentions

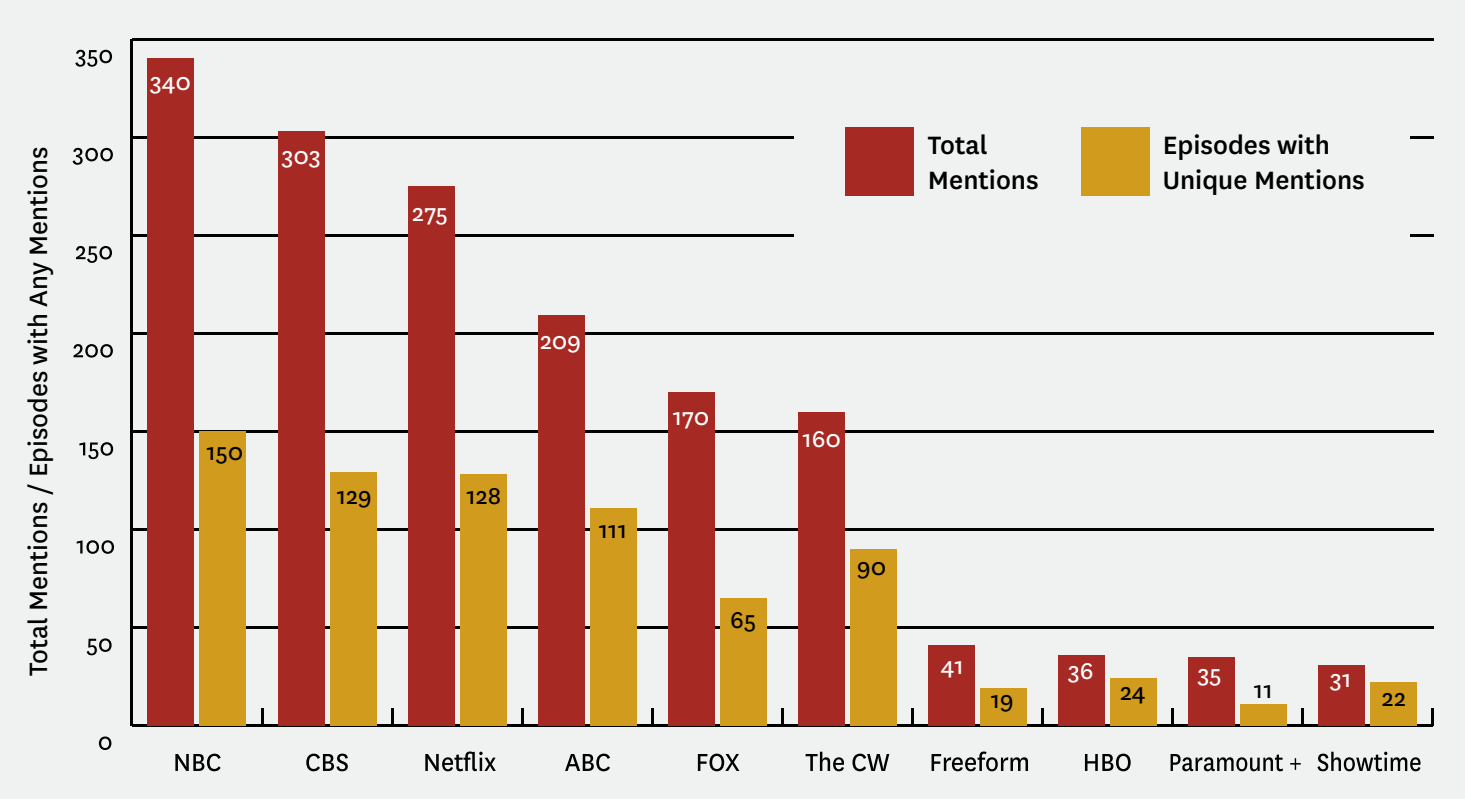


Table 4.

Shows with Most English-Language Keyword Mentions

Top TV Shows	Mentions	Episodes with Mentions
The Resident (FOX)	101	30
Chicago Med (NBC)	87	37
The Imperfects (Netflix)	74	11
Grey's Anatomy (ABC)	70	35
Blindspot (NBC)	51	14
The Good Doctor (FOX)	48	19
The Blacklist (NBC)	45	16
New Amsterdam (NBC)	41	21
Orphan Black (Netflix)	41	16
NCIS: LA (CBS)	34	7

FUTURE OF MEDICINE MENTIONS IN SPANISH-LANGUAGE SCRIPTED ENTERTAINMENT

Methods

To capture the broadest possible range of relevant dialogue, we expanded the 41 English-language *future of medicine* keywords to 76 keywords. All keywords were translated into Spanish, confirmed by native Spanish speakers, and tested for visibility using TVEyes, a media monitoring tool. Only 17 of these 76 keywords yielded results in either the Spanish broadcast or Netflix datasets.

To establish a baseline for the representation of the *future of medicine* in Spanish-language scripted media, we queried mentions of *future of medicine* keywords across both broadcast and Netflix streaming content

- **Broadcast content:** We tracked mentions of *future of medicine* keywords across one year (December 1, 2023 - November 30, 2024) of content from the top five Spanish-language broadcast television networks in the U.S. (Estrella TV, Univision, Telemundo, Mundo Fox, and UniMás). Mentions were queried from TVEyes transcripts from Los Angeles affiliate stations, and mentions in news, unscripted, sports, and commercials were excluded.
- **Netflix content:** We first identified 1,346 pieces of Spanish-language original scripted content on Netflix in 2024, including 88 movies and 1,261 episodes from 59 TV series. We identified and catalogued English-language subtitles for each piece of content, and queried them for mentions of the English translations of the Spanish-language keywords.

Key Findings

Because the time frames, keywords, and identification criteria differed between English- and Spanish-language content, making direct comparisons is challenging. We identified:

- **179 keyword mentions** across one year of scripted programming from the five major Spanish-language broadcast TV networks. This is roughly equal to the annual average of 169 across the five English-language broadcast networks.
- **77 keyword mentions** across one year of original Spanish-language TV series and films on Netflix, nearly twice the annual average in English-language Netflix content (39).

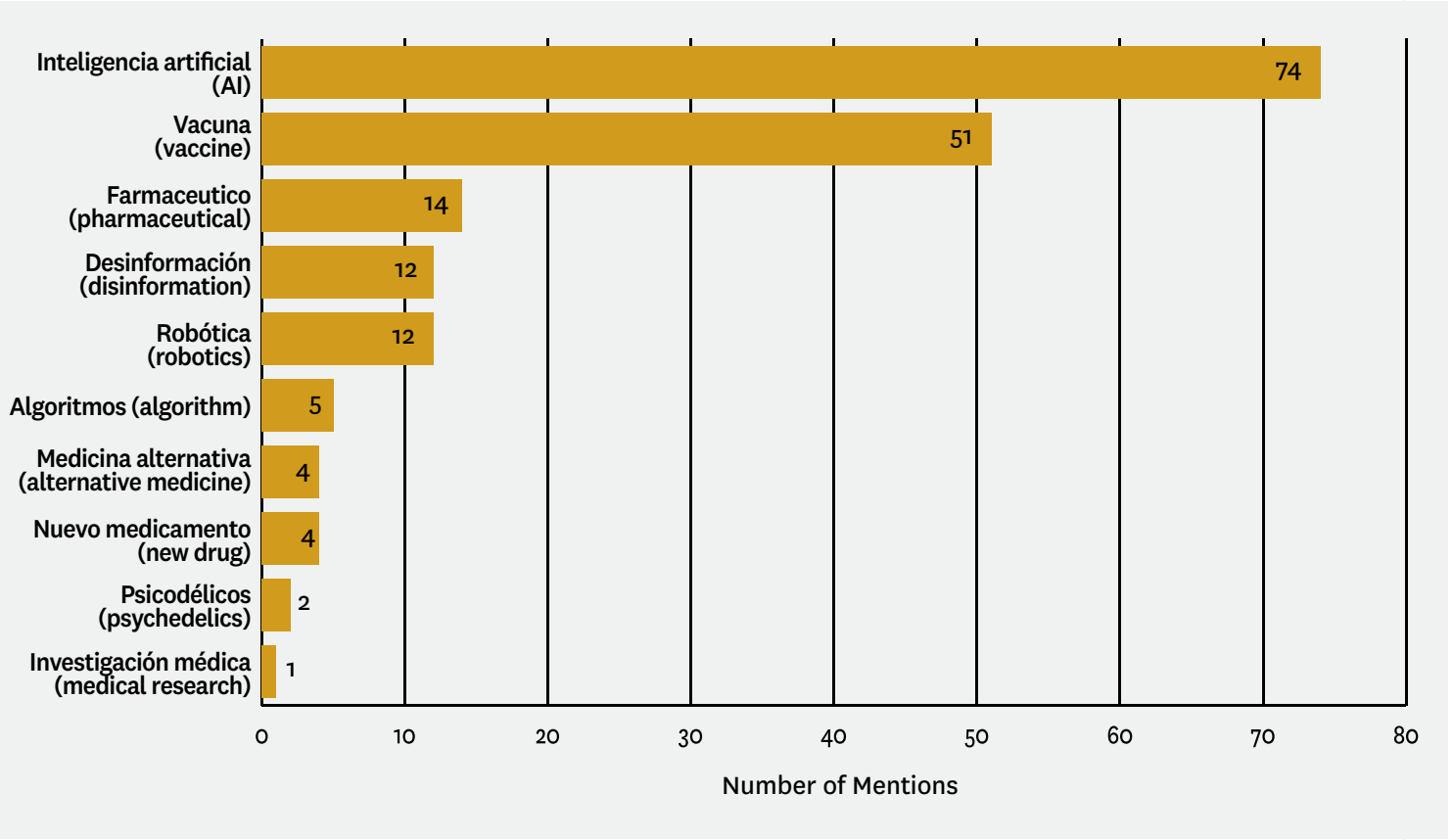
BROADCAST MENTIONS

Of the 17 keywords we retained, 10 were mentioned in Spanish-language broadcast scripted content, a total of 179 times.

- More than 40% of the 179 *future of medicine* keyword mentions were "inteligencia artificial" (artificial intelligence).
- Another 28% were "vacuna" (vaccine).

Figure 5.

Keyword Mentions in Spanish-Language Broadcast Content



Over 40% of the broadcast mentions appeared in telenovelas and 30% in dramas.

- Nine Spanish-language broadcast TV series had at least five mentions each of *future of medicine* keywords, while 24 had at least one mention.
- The anthology drama series *Como Dice El Dicho* led the way with 32 mentions. The show's *future of medicine* references tended to surface in storylines about treatment adherence, and ethical tensions around new technologies, framing medical progress through the lens of lived experience and social trust.

Figure 6.

Broadcast Spanish-Language Keyword Mentions by Genre

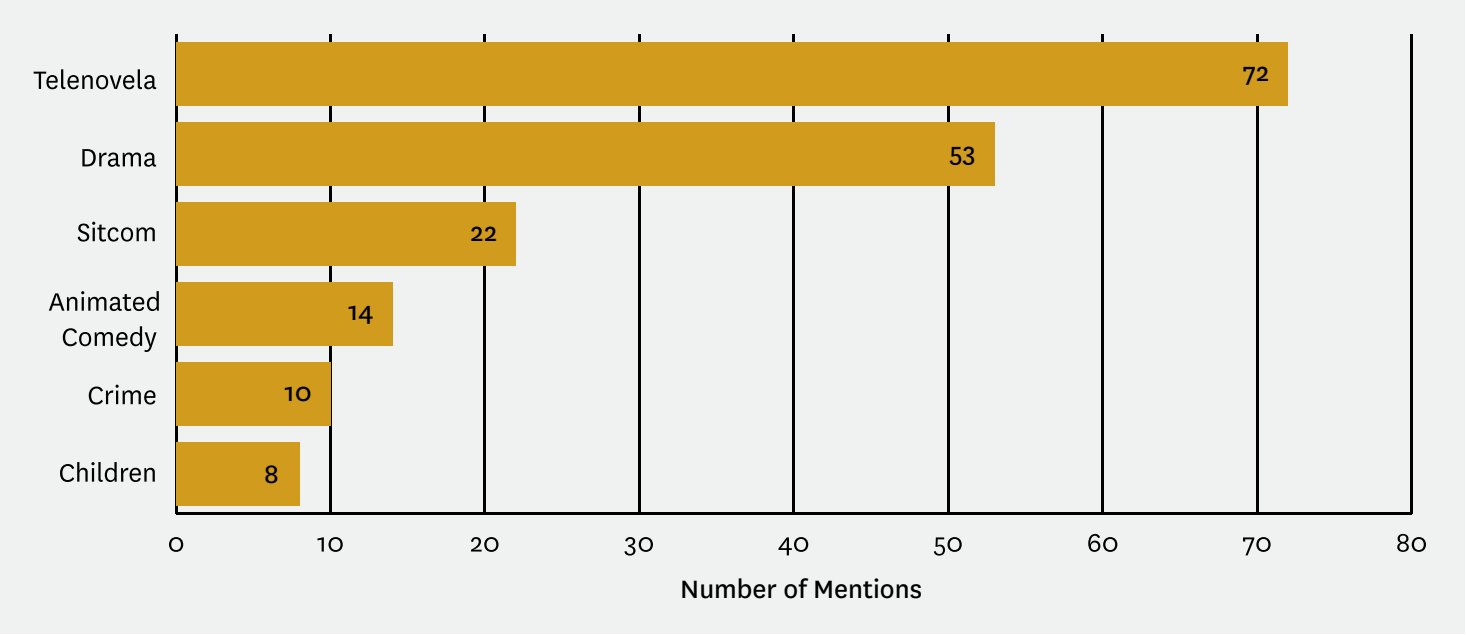


Table 5.

Broadcast Content with Most Spanish-Language Keyword Mentions

Show	Genre	Keywords Mentioned	Mentions
Como Dice el Dicho (As the Saying Goes)	Anthology Drama	Desinformación (misinformation), farmacéutico (pharmaceutical), inteligencia artificial (AI), robótica (robotics), vacuna (vaccine)	32
Cantinflas Show	Animated Comedy	Vacuna (vaccine)	14
El Amor No Tiene Receta (Love Has No Recipe)	Telenovela, Drama	Inteligencia artificial (AI)	13
Pedro el Escamoso (Pedro the Show-off)	Telenovela, Comedy-Drama	Algoritmos (algorithm), inteligencia artificial (AI)	11
Vecinos (Neighbors)	Sitcom	Farmacéutico (pharmaceutical), inteligencia artificial (AI), psicodélicos (psychedelics), vacuna (vaccine)	10
Esta Historia Me Suena (It Rings a Bell)	Anthology Drama	Inteligencia artificial (AI), farmacéutico (pharmaceutical), medicina alternativa (alternative medicine), vacuna (vaccine)	8
El Señor de los Cielos (The Lord of the Skies)	Crime Drama, Action	Desinformación (misinformation), inteligencia artificial (AI),	7
Marea de Pasiones (Tide of Passions)	Telenovela, Drama	Vacuna (vaccine)	6
Mi Corazón es Tuyo (My Heart Is Yours)	Telenovela, Romantic Comedy	Vacuna (vaccine)	5

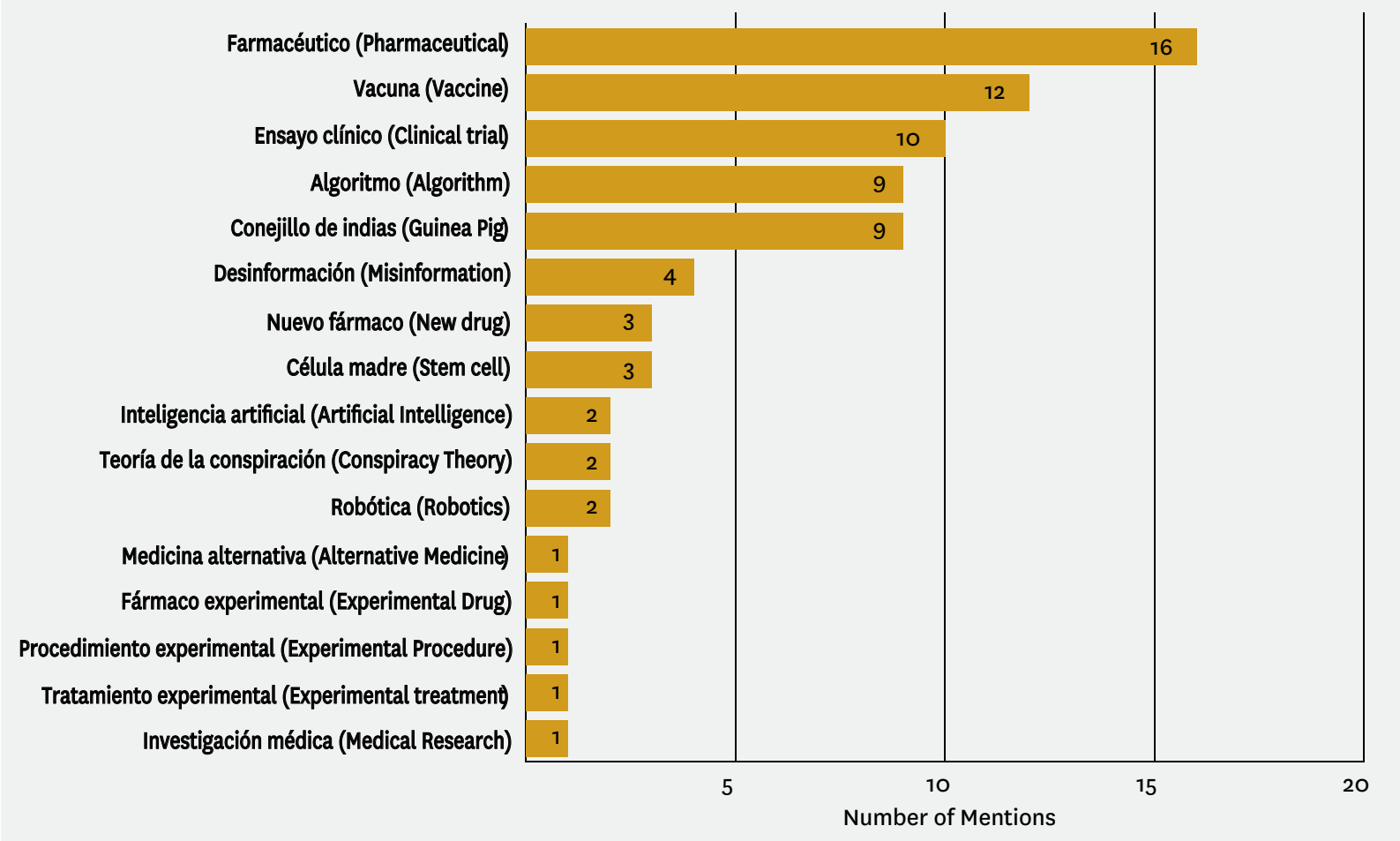
Netflix Mentions

We identified a total of 77 mentions of 16 *future of medicine* keyword mentions in Netflix scripted content.

- "Farmacéutico" (pharmaceutical) was the most frequently mentioned keyword, followed by "vacuna" (vaccine), "ensayos clínicos" (clinical trial), "algoritmos" (algorithm), and "cobayos" (guinea pig). "Clinical Trial" is the keyword in the top five mentions in both the English and Spanish frequency analyses.

Figure 7.

Keyword Mentions in Spanish-Language Netflix Content



By far, the most common genre was drama, primarily telenovelas, accounting for more than one in three mentions of *future of medicine* keywords.

- Only one mention appeared in a Netflix comedy, though 10 appeared in comedy dramas. The rest were in various drama and thriller subgenres.
- Six Spanish-language Netflix series had at least three mentions of *future of medicine* keywords.
- The telenovela *Madre de Alquiler (The Surrogacy)* had the most keyword mentions (24) of all Spanish-language Netflix content. The storyline involved a dramatic unethical clinical trial that caused babies to be born with clubfoot.

Figure 8.

Netflix Spanish-Language Keyword Mentions by Genre

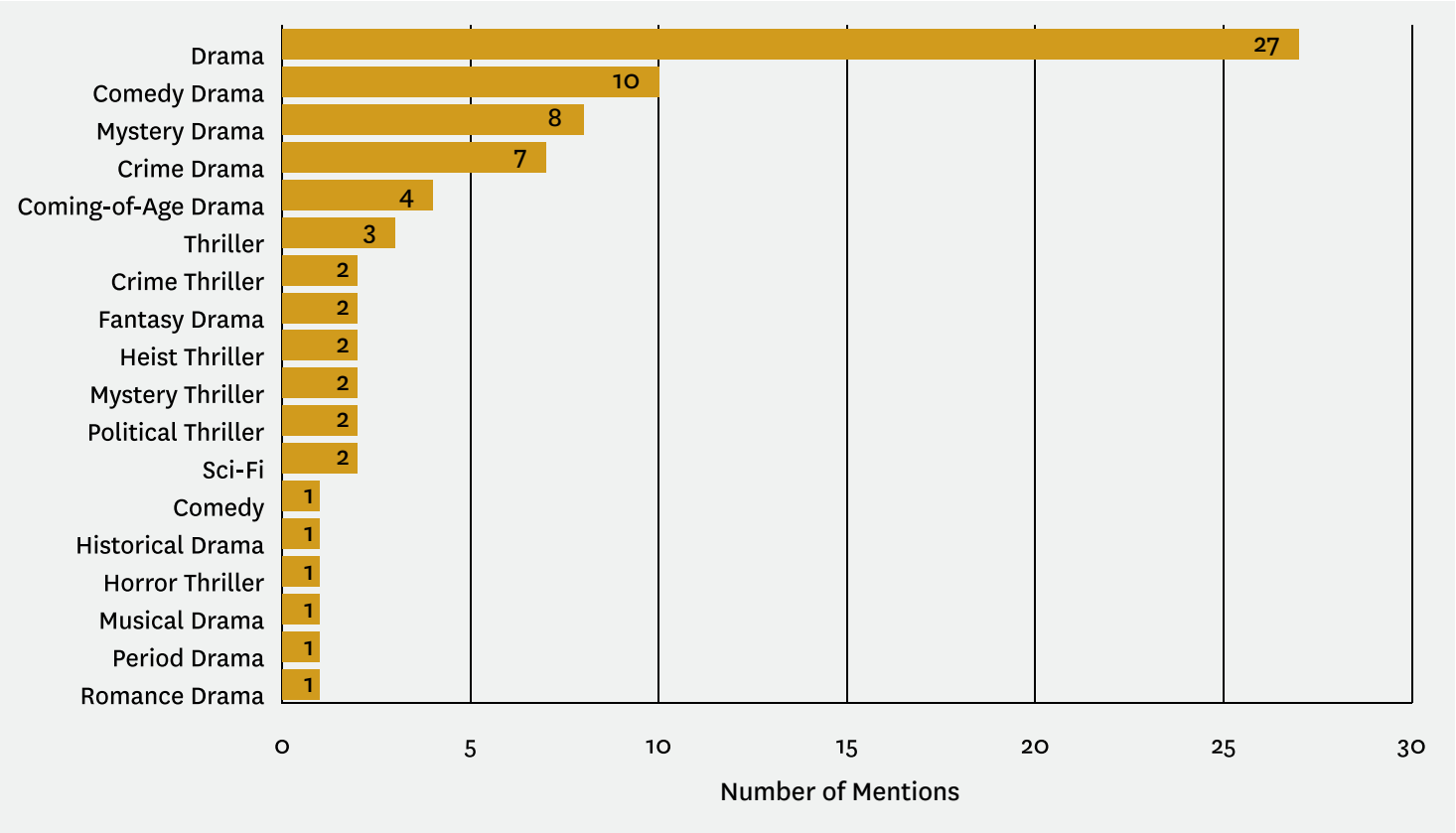


Table 6.

Netflix Content with Most Spanish-Language Keyword Mentions

Genre	Keywords Mentioned	Mentions
Drama	Ensayos clínicos (clinical trial), investigación médica (medical research), desinformación (misinformation), farmacéutico (pharmaceutical)	24
Mystery, Period Drama	Cobayos (guinea pig), vacuna (vaccine)	7
Crime, Thriller	Algoritmos (algorithm), vacuna (vaccine)	5
Comedy, Drama	Células madre (stem cell), vacuna (vaccine)	4
Drama, Coming-of-Age	Desinformación (misinformation), nuevo medicamento (new drug), farmacéutico (pharmaceutical), vacuna (vaccine)	4
Comedy, Drama	Desinformación (misinformation), robótica (robotics), células madre (stem cell)	3

PORTRAYALS OF CLINICAL TRIALS IN SCRIPTED TV AND FILM

Methods

To identify relevant content, we began by searching the Norman Lear Center Script Database for television and film transcripts that mentioned "clinical trial." We then narrowed the sample to 100 episodes (92 TV episodes from 43 series; 8 films)[8] released between 2016-2023 that mentioned "clinical trial" most frequently. Of the 43 TV series, five were among the top 10 broadcast series, according to Nielsen ratings.[9]

Student coders analyzed each episode for the type of clinical trials represented, trustworthiness, benefits and harms caused, and willingness of patients to participate. Within the 100 episodes, we analyzed the demographics and other characteristics of 260 characters, including patients, staffers, and characters who introduced the topic of clinical trials.

Key Findings

Episode-Level

Four out of five episodes (82%) made reference to a specific clinical trial.

- 31% disclosed funding sources of a trial, which were mostly private funding.
- 40% depicted a clinical trial that was testing a medication.[10]
- 20% depicted a clinical trial that was related to cancer.

Clinical trials were commonly presented as attractive to participants.

- 29% of episodes presented a trial as a last resort or "plan B" for a medical patient with a serious health condition.
- 9% showed characters devising creative strategies to get someone into a trial.
- 20% demonstrated positive results of a clinical trial.

While the majority of episodes portrayed clinical trials as trustworthy, a substantial proportion did not.

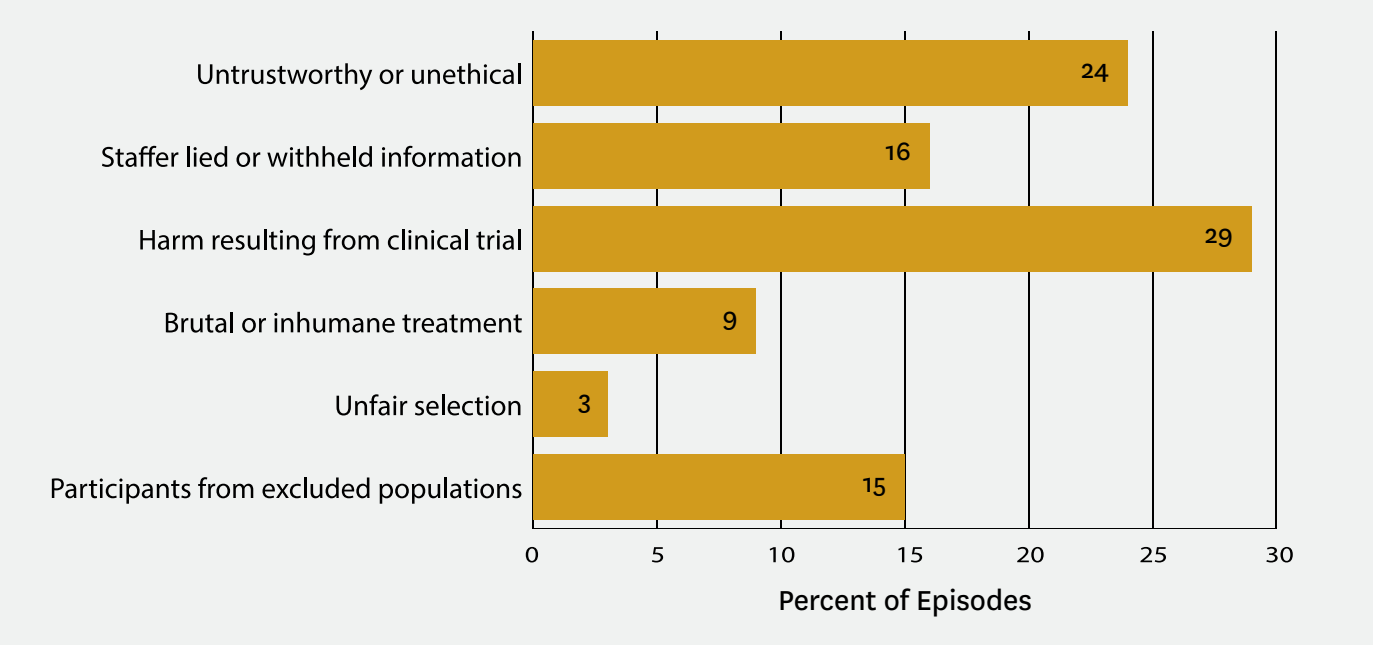
- 24% portrayed clinical trials as untrustworthy. This included unethical practices such as breaches of confidentiality, forgery, bribes, misrepresentation of results, and breaking with protocol.
- 16% showed a staffer who lied or withheld important information about a trial.
- 29% showed someone being harmed as a result of a clinical trial.
- 9% showed brutal or inhumane treatment of trial participants.

8 Unless otherwise noted, "episodes" refers to both TV episodes and movies in this report.
9 These included *Chicago Med* (9 episodes), *FBI* (1 episode), *FBI: Most Wanted* (1 episode), *Fire Country* (1 episode), and *Law & Order: SVU* (2 episodes).
10 This item was created through secondary coding of coders' qualitative responses.

- 3% showed participants being unfairly selected for a trial.
- 15% depicted trial participants from populations often excluded from medical research, including children, senior citizens, and institutionalized individuals.
- However, only two out of 14 episodes from the top 10 most viewed series (according to Nielsen ratings) portrayed any untrustworthy behavior associated with a clinical trial.

Figure 9.

Episodes Portraying Untrustworthy Clinical Trials



Ten episodes portrayed clinical trials as "very untrustworthy," including three films centered around illegal clinical trials with horrible consequences.

- In *Misconduct* (2016), a pharma CEO "forged expert reports that allowed him to slip by FDA approval," leading to the deaths of many patients.
- In the indie film *Painless* (2017), a doctor convinces a clinical trial staffer to illegally "up the dosages [of a drug], way above protocol," causing five participants to develop tumors and die.
- *Obsidian* (2020) is a low-budget, body-horror film about a trial for a "miraculous" new drug that actually has gruesome and deadly consequences.
- None of the episodes that depicted "very untrustworthy" trials appeared in a top 10 series.

Character-Level

We analyzed the characteristics of 69 patients in clinical trials, who were largely portrayed in a positive light (83%).

- About two in three patients (64%) were White. Nineteen percent were Black, followed by 12% Asian or Pacific Islander, and 6% Latino.
- More than half (54%) of patients were between the ages of 18 and 39, with another 22% between 40 and 64. Sixteen percent of patients were 65 or older and 9% were minors.

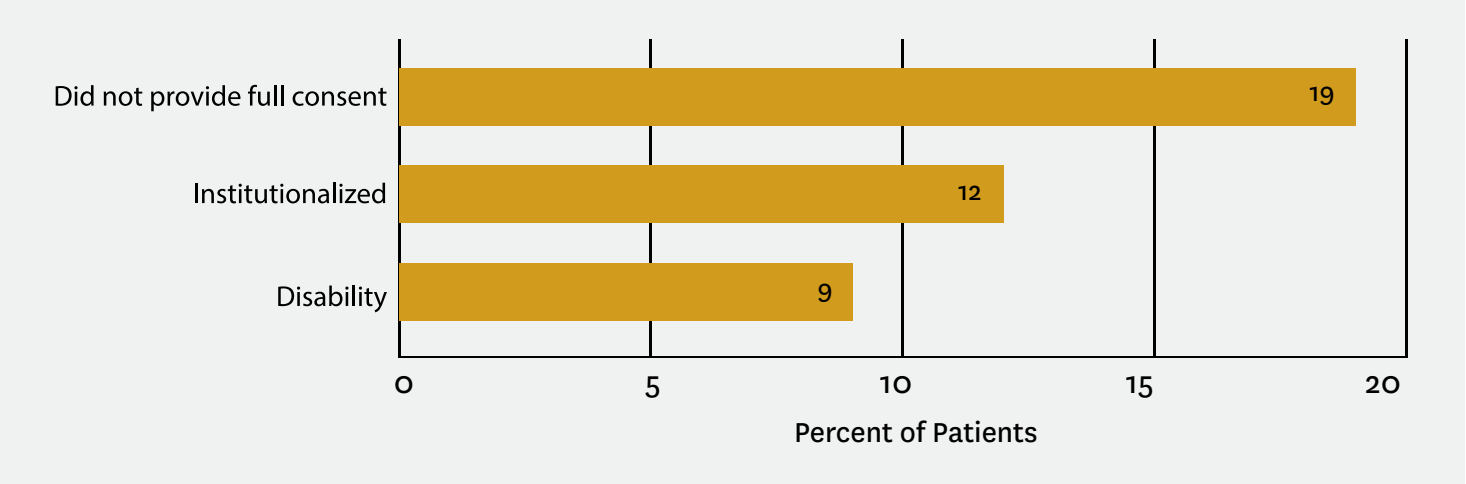
- There were slightly more women (55%) than men (45%),[11] and patients were predominantly middle class (92%).[12]

Informed consent to participate in a clinical trial was not always evident.

- Nineteen percent of patients did not provide full consent to participate in a trial.
- Twelve percent were institutionalized in some form.
- Nine percent had a disability.[13]

Figure 10.

Patient Characters for Whom Informed Consent Was Not Evident



We examined 108 clinical trial staffers, of whom 71% were portrayed in a positive light.

- Clinical trial staffers were mostly men (56%). Approximately half (51%) were White, and a quarter (26%) were Asian or Pacific Islanders. Other races were less frequent.
- Three in four portrayed staffers (77%) were medical professionals. Ten percent were researchers and 9% were on the business side.

11 Four patients were queer, and none were trans or non-binary. However, we were unable to calculate reliability for these items, as there were no positive cases in our reliability sample.
12 This item had marginal reliability (α = .57).
13 We were unable to calculate reliability for these items, as there were no positive cases in our reliability sample.

CONCLUSION

The study explored the representation of the future of medicine through multiple methods: interviewing medical experts and TV creatives, analyzing the representation of clinical trials on TV, and exploring the content of English- and Spanish-language transcripts of TV episodes and films.

The findings showed multiple promising trends and opportunities for representing the future of medicine:

- Interviewed TV creatives showed an appetite for more stories about cutting edge medical. interventions as long as they were novel and fit into their show's storyworld.
- Clinical trials — a key facilitator of the future of medicine — were represented in popular TV series as mostly trustworthy.
- Keywords connected to the future of medicine had an uptick in TV and film transcripts in 2021, possibly in connection to news coverage of public health emergencies.

Currently, we are repeating the analysis of English-language keyword mentions to measure shifts from baseline and studying the audience impact of an ongoing *Grey's Anatomy* storyline involving a gastric cancer clinical trial on which Hollywood, Health & Society consulted. Next steps for this line of research include repeating the Spanish-language keyword analysis and analyzing social media discourse around the *Grey's Anatomy* storyline.

Recommendations for Storytellers, Advocates & Funders

1. **Portray innovative medical advances in a way that fits seamlessly into the story world.** Consider showing how new medicines and treatments can make a difference for those living with chronic health conditions.
2. **Highlight less visible advances in medicine** like cell therapy, medical devices, precision medicine, and regenerative medicine.
3. **Be conscious of portraying clinical trials as untrustworthy, unethical, or even harmful.** Such depictions have the potential to further erode trust in medicine and science.
4. **Encourage learning about clinical trials through calls to action, including PSAs.** Showcase members of different communities learning about and participating in clinical trials.
5. **Engage expert consultants to ensure medical advances and clinical trials are portrayed with accuracy and fidelity.** HH&S provides the entertainment industry with free access to experts and up-to-date resources to inform storylines.
6. **Support research into audience demand for — as well as the reach and impact of — stories that address the *future of medicine*.** Perceptions of what executives want may not match the reality of what audiences want.

APPENDIX A:
INTERVIEW PROTOCOLS

Experts

1. Describe your role, your work on health/medicine, your work with CTSI.
2. Describe the community/region served by your CTSA
3. What are the pressing health and medical issues and concerns in this community/region?
   - 3.1 Can you describe views in the community regarding: the future of medicine?. This includes cutting edge medical approaches, like gene therapy, precision health, regenerative medicine, cell-based therapy, nanotechnology, AI.
   - 3.2 Can you describe views in the community regarding: participation in medical research? This includes clinical trials and research studies.
4. How would you characterize trust in medicine in this community/region?
   - 4.1 Challenges concerning public trust in medicine in this community/region? Opportunities concerning public trust in medicine?
   - 4.2 What sources of medical information are considered trustworthy?
5. How, if at all, have these issues/topics/concerns, priorities, trust dynamics been affected by the pandemic?
6. Tell us about health outreach/messaging your CTSA is working on in the community/region
   - 6.1 How might this community's reception of messaging and outreach differ from others in the country?
   - 6.2 What has worked with health outreach/messaging the community/region?
   - 6.3 What has not worked with health outreach/messaging in the community/region?
7. Given what you have mentioned about the pressing issues and concerns in the community, what types of media messaging would respond to their needs, deliver accurate information, and foster trust?
   - 7.1 Do you see the raised issues/topics concerns in popular media? How are they treated?
   - 7.2 Any examples that are particularly helpful and informative? Feedback you've gotten in the community?
   - 7.3 Any examples of unhelpful, uninformative treatment?
8. What kinds of stories or messages in popular media (TV/movies) would you consider as helpful and informative given the raised issues/topics/concerns?

Entertainment Insiders

1. Background: describe your role, your work on health-related content + storylines
2. Describe your target audiences
3. What kinds of health- and medicine-related stories do you work on?

- **3.1** *Prompts* [informed by expert interviews]:
  - **3.1.1** Systemic issues? Access?
  - **3.1.2** Race? Gender?
  - **3.1.3** Mental health
  - **3.1.4** Cutting edge technologies / future of medicine?
  - **3.1.5** Chronic diseases?
- **4.** What kinds of health- and medicine-related stories do we need more of?
  - **4.1** What are the barriers and opportunities for getting these kinds of stories on the air?
- **5.** What makes for compelling health-related content or storylines?
- **6.** What has resonated with your audiences when it comes to health content?
  - **6.1** *Prompt:* Kinds of messages/plotlines, kinds of messengers/characters?
- **7.** What has not resonated with your audiences when it comes to health content?
  - **7.1** *Prompt:* Kinds of messages/plotlines, kinds of messengers/characters?
- **8.** Do you think any of this has changed post pandemic?

APPENDIX B:
FREQUENCY ANALYSIS KEYWORDS

English

English Keywords	
1. bioprinter	22. medical devices
2. biotech	23. medical research
3. cell therapy	24. microbiome
4. clinical study	25. misinformation
5. clinical trials	26. neural network
6. crispr	27. new drug
7. cutting edge medicine	28. new procedure
8. cutting edge research	29. new vaccine
9. disinformation	30. pharmacogenomics
10. experimental drug	31. precision oncology
11. experimental procedure	32. precision therapy
12. experimental research	33. promising research
13. experimental treatment	34. regenerative medicine
14. future of medicine	35. revolutionary treatment
15. gene editing	36. revolutionized medicine
16. gene sequencing	37. stem cells
17. gene therapy	38. surgical robots
18. genome sequence	39. synthetic biology
19. health outcomes	40. telehealth
20. human guinea pig	41. telemedicine
21. medical breakthrough	

Spanish

A total of 76 keywords were tested in the Spanish-language frequency analysis (including the 41 English-language frequency analysis keywords. Seventeen Spanish-language keywords were mentioned in either the Spanish-language Broadcast or Netflix content.

#	Spanish Keyword	English Equivalent
1.	Algoritmos	Algorithm
2.	Células madre	Stem Cell
3.	Cobayos	Guinea Pig
4.	Desinformación	Misinformation
5.	Ensayos clínicos	Clinical Trial
6.	Farmacéutico	Pharmaceutical
7.	Inteligencia artificial	Artificial Intelligence (AI)
8.	Investigación médica	Medical Research
9.	Medicamento experimental	Experimental Drug
10.	Medicina alternativa	Alternative Medicine
11.	Nuevo medicamento	New Drug
12.	Procedimiento experimental	Experimental Procedure
13.	Psicodélicos	Psychedelics
14.	Robótica	Robotics
15.	Teoría de la conspiración	Conspiracy Theory
16.	Tratamiento experimental	Experimental Treatment
17.	Vacuna	Vaccine

Keyword mentions were not assessed for relevance to medical contexts in English or Spanish frequency analyses.

APPENDIX C:
CONTENT ANALYSIS SAMPLE

To identify relevant content, we began by searching the Norman Lear Center Script Database for television and film transcripts containing the term "clinical trial" in episode dialogue. We then narrowed the sample to 100 episodes (92 TV episodes from 43 distinct series, 8 films) that premiered between 2016-2023 and contained the term clinical trial most often. Five of the TV series were "Top 10" broadcast series, according to Nielsen ratings:

- *Chicago Med* (9 episodes)
- *FBI* (1 episode)
- *FBI: Most Wanted* (1 episode)
- *Fire Country* (1 episode)
- *Law & Order: SVU* (2 episodes)

Within the 100 episodes, we analyzed 260 characters in three mutually inclusive categories:

- 69 patients of clinical trials
- 108 staffers of clinical trials
- 100 characters who introduced the topic of clinical trials

TV Episodes

Name	Season	Episode	Year
Batwoman	3	12	2022
Blindspot	3	7	2017
Blindspot	4	8	2018
BrainDead	1	5	2016
Bull	2	8	2017
Chicago Med	4	16	2019
Chicago Med	4	21	2019
Chicago Med	6	12	2021
Chicago Med	6	14	2021
Chicago Med	6	5	2021

Name	Season	Episode	Year
Chicago Med	6	8	2021
Chicago Med	7	1	2021
Chicago Med	7	2	2021
Chicago Med	6	3	2021
Circuit Breakers	1	1	2022
Clarice	1	1	2021
Clarice	1	13	2021
Clarice	1	3	2021
Clarice	1	6	2021
Clarice	1	7	2021
Clarice	1	9	2021
Clarice	1	5	2021
Clarice	1	8	2021
Clarice	1	4	2021
Criminal Minds	12	4	2016
Criminal Minds	12	8	2016
Dead to Me	3	9	2022
Dead to Me	3	10	2022
Doctor Doctor	1	9	2017
Dynasty	4	11	2021
Dynasty	1	20	2018
Emergence	1	9	2019
FBI	3	13	2021
FBI Most Wanted	3	4	2021

Name	Season	Episode	Year
Fire Country	1	4	2022
From Scratch	1	5	2022
Good Sam	1	4	2022
Grey's Anatomy	13	18	2017
Grey's Anatomy	17	4	2020
Grey's Anatomy	18	3	2021
Grey's Anatomy	18	4	2021
Grey's Anatomy	19	2	2022
Ill Behaviour	1	1	2017
Jack Irish	2	6	2018
Jack Irish	2	5	2018
Law & Order: Special Victims Unit	21	16	2020
Law & Order: Special Victims Unit	21	8	2019
Lethal Weapon	1	5	2016
Life Sentence	1	8	2018
Life Sentence	1	3	2018
Longmire	5	4	2016
Mary Kills People	1	2	2017
NCIS New Orleans	4	7	2017
New Amsterdam	2	18	2020
New Amsterdam	1	9	2018
New Amsterdam	2	8	2019
Nightcap	2	1	2017
Orphan Black	4	9	2016

Name	Season	Episode	Year
Paranoid	1	7	2016
Power	5	2	2018
Royal Pains	8	6	2016
Saving Hope	5	6	2017
Siren	1	6	2018
The Blacklist	5	5	2017
The Catch	1	3	2016
The Cleaning Lady	1	3	2022
The Good Fight	6	6	2022
The Resident	2	7	2018
The Resident	4	10	2021
The Resident	4	12	2021
The Resident	4	13	2021
The Resident	5	11	2022
The Resident	5	15	2022
The Resident	5	16	2022
The Resident	5	22	2022
The Resident	5	8	2021
The Resident	6	1	2022
The Resident	6	12	2023
The Resident	6	2	2022
The Resident	6	9	2022
The Resident	5	9	2021
The Resident	1	2	2018

Name	Season	Episode	Year
The Resident	1	20	2018
The Resident	5	10	2021
The Resident	5	13	2022
The Widow	1	1	2019
This Is Us	4	16	2020
This is Us	4	17	2020
This Is US	4	18	2020
This is Us	5	1	2020
Tom Clancy's Jack Ryan	2	5	2019
What/If	1	5	2019
What/If	1	4	2019

Films

Title	Year
All My Life	2020
Little Fish	2020
Misconduct	2016
Obsidian	2020
Painless	2017
Reset	2017
The Most Colorful Time of the Year	2022

APPENDIX D:
CONTENT ANALYSIS PROCEDURE

We rigorously trained nine student coders to analyze 33 substantive codebook items over a period of two months. Each episode was coded for the presence or absence of content related to trustworthiness of clinical trials. We trained coders on 16 substantive items measuring content at the *episode level*, pertaining to:

- Types of clinical trials represented
- Trustworthiness of clinical trials
- Benefits and harmed caused by trials
- Eagerness of patients to participate in trials
- Number of clinical trial patients and staffers

For every episode that referred to a specific clinical trial, characters who were participants (patients) in the trial or were assisting the trial in a professional capacity (staffers) were selected for character-level analysis. Characters who first introduced the topic of clinical trials (introducers) in episode dialogue were also selected for additional character-level analysis. We trained coders on 17 substantive items measuring content at the character level pertaining to:

- Character demographics (race, gender, age, etc.)
- Whether or not the character's profession was evident[14]
- Whether patients provided informed consent to participate in a trial

Ten episodes in the sample were initially double-coded to establish interrater reliability. After discussing discrepancies, the remaining 90 episodes were coded. An additional 10 episodes were randomly selected for double coding and further reliability analysis.[15]

Episode Level Codebook & Reliability

Item	Description	Alpha
Barriers to care	Are any social barriers to care depicted in this episode?	0.46
Convince	Does a character make any efforts to convince another character to enroll in a clinical trial?	0.80
Creative solutions	Does a speaking character break any rules in order to get someone into a clinical trial?	0.92
Devious trial	Is a clinical trial portrayed in this episode in a way that matches the "devious clinical trial" trope?	0.92

14 Coders were asked to provide a qualitative description of the character's profession, if evident. Character professions were inductively classified into job categories via secondary coding.

15 Items that achieved adequate reliability were retained in the codebook unchanged. Items that did not achieve adequate reliability are not included in this report.

Item	Description	Alpha
Funding	Does the episode provide any information about the sources of funding for a clinical trial?	0.75
Health outcomes	Do we see any positive or negative outcomes of a clinical trial on a speaking character's health?	0.73
Inhumane treatment	Does this episode indicate that there has been brutal or inhumane treatment of any participants?	0.91
Injury	Did at least one participant experience physical injury from participating in a trial?	0.86
Last hope trope	Is a clinical trial portrayed in this episode in a way that matches the "last hope for a sick person" trope?	0.73
Last resort	Is a clinical trial portrayed or described as a "last resort" for someone desperate for a medical solution?	0.61
Lying	Do we learn that any parties involved in running a clinical trial lied about the trial?	0.92
Negative incentive	Was at least one person pressured or coerced into participating in a clinical trial?	0.85
# of participants	How many clinical trial patients were in this episode?	0.87
Number of staffers	How many clinical trial staffers were in this episode?	0.91
Period	When does this episode primarily take place?	0.73
Positive incentive	Do we learn that anyone was offered a positive incentive to participate in the trial?	0.92
Positive results	Are any actual positive scientific or personal results from a particular clinical trial discussed?	0.74
Potential benefits	Are the possible or actual public benefits of the trial discussed anywhere in the episode transcript?	0.73
Shady individual	Is the clinical trial associated with any illegal or immoral practices?	0.65
Specific	Is at least one specific clinical trial discussed or referenced in this episode's dialogue?	0.64
Suspicious trial	Does this episode introduce the possibility that a clinical trial is somehow untrustworthy?	0.84
Trustworthy	How trustworthy are the clinical trial(s) in this episode?	0.64

Item	Description	Alpha
Unfairly selected	Were participants in a clinical trial selected unfairly according to demographic characteristics?	0.82
Untrustworthy	Is a clinical trial portrayed as somehow untrustworthy?	0.91

Character Level Codebook & Reliability

Item	Description	Alpha
Addict	Is this character addicted to a controlled substance?	NA
Age	What is this character's age?	0.87
Class	What is this character's socio-economic status?	0.57
Consent	Did this character provide full consent to participate in a clinical trial?	1.00
Disability	Does this character have a disability?	NA
English	Does this character only speak English?	NA
Fat	Is this character fat?	NA
Sex	Is this character a man or woman?	1.00
Institutionalized	Is this character institutionalized in some capacity?	NA
Insured	Does this character make any mention of health insurance?	NA
Introduces topic	Does this character introduce the topic of clinical trials in the episode?	0.85
Job	Is this character's profession made evident?	0.87
Participant or staff	Is this character a clinical trial participant, staff, or neither?	0.82
Gay	Is this character gay?	NA
Race	What is the race of this character?	1.00
Valence	Is this character positively or negatively valenced?	0.61