

Whose Story Is It? Exploring Roles and Character Representation in Narrative Medical Visualization

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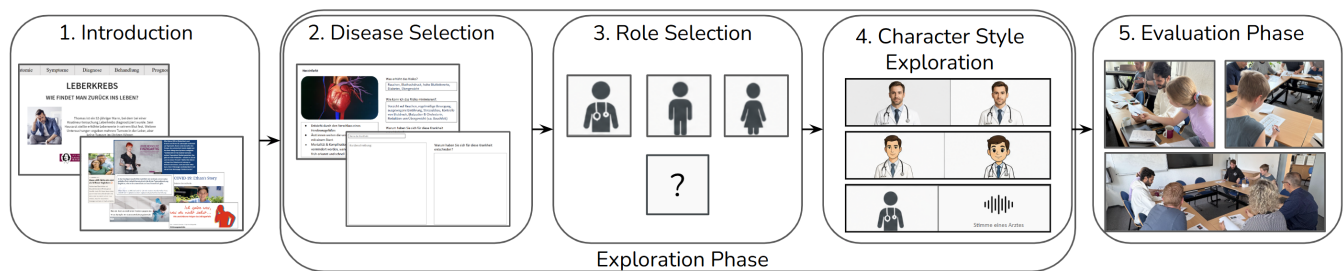


Figure 1: Overview of the workshop workflow. Sources of the introductory example stories & detailed materials are listed in the supplemental material. Step 4 provides an example of the explored character design space, illustrating the six visual abstraction levels used in the workshop.

Abstract

Narrative medical visualizations communicate complex medical information to non-expert audiences through engaging, easy-to-understand stories. While previous studies have explored patient-centered storytelling and AI-generated medical characters, research has rarely examined audience preferences for character design and visual representation styles in these narratives. In an exploratory mixed-methods workshop study with two phases, we first investigated participants' preferences for character roles (e.g., physician, patient, or relative) and for visual styles ranging from realistic to abstract. In the second phase, participants evaluated their selected characters, alongside others, on trustworthiness, credibility, empathy, and impartiality, providing qualitative reasoning for their decisions. Our findings show a strong preference for realistic character representations; the physician and patient were selected equally often. Patients were perceived as more empathetic, while physicians were considered slightly more trustworthy and credible. Qualitative feedback further highlights tensions between realism and abstraction, the importance of personal experience, and identification with characters in narrative medical visualizations. We discuss the implications for audience-centered design in narrative medical stories and for the future of exploratory workshop formats.

Categories and Subject Descriptors (according to ACM CCS):

CCS Concepts

• *Human-centered computing* → *Scientific visualization*; • *Applied computing* → *Life and medical sciences*;

1. Introduction

Despite the growing availability of medical information, much of it remains difficult for non-experts to interpret and understand. However, this ability is essential for making informed decisions about one's health [BSD*11]. Narrative medical visualizations aim to help patients and the general public understand complex medical information by presenting it in accessible, story-based formats [MGS*22]. These narratives are designed to be engaging and

emotionally compelling, presenting medical information in a relatable and understandable way [GMPB23].

Many existing narrative medical visualizations are patient-centered, telling stories from the perspective of someone affected by a specific disease [KSM*22, MGM*23, BGH*19]. Previous studies have investigated the influence of AI-generated characters in medical stories [BGPM23, MGB*25] and the differences between physician- and patient-centered narratives [MWS*23]. However, little is known about alternative roles in medical storytelling,

such as relatives or other supporting characters, or about how different character representation styles may influence audience perception.

To better understand audience-centered preferences in this context, we conducted an exploratory workshop study with participants from a broad audience with varying health and storytelling experiences. We investigated how participants select and evaluate character roles and visual styles across different medical contexts.

Through this exploratory study, we aim to address the following research questions:

RQ1: How do participants select and justify character roles and visual styles for narrative medical visualizations?

RQ2: How are different character representations perceived in terms of trustworthiness, credibility, impartiality, and empathy?

RQ3: Which underlying rationales influence audience preferences for narrative medical characters?

2. Related Work

Narrative Visualization. Narrative visualization combines storytelling with data visualization [SH10] to convey information in an engaging and understandable way [SAH25]. It has been applied across a variety of domains, including healthcare, sports, and education [SAH25]. These visual stories are often designed for broad audiences without domain-specific expertise [HXC*25, BKVR*20]. Narrative visualizations can be structured in various ways, one of which is the genre. This includes, e.g., slideshows, scrollytelling applications, and data comics [SH10, CCWC24].

Previous studies have explored participatory approaches to creating such data comics. For instance, Wang et al. [WDB19] held a workshop where participants collaborated to create data comics in an illustration class. Similarly, Dolbeth et al. [DLFA24] collaborated with a group to develop data comics on the pandemic. These studies highlight the creative potential of workshop-based approaches to narrative visualization and the importance of participants' personal interest in the topic under discussion [WDB19]. Little research has been conducted on participatory approaches to other genres or applications of narrative visualizations.

Narrative Medical Visualization. Meuschke et al. defined narrative medical visualization as "the combination of narrative techniques with medical visualization to tell data-driven stories about diseases" [MGS*22]. Based on this definition, they proposed a seven-step template for disease stories and implemented it in three slideshow-based case studies. Their user study reported increased understandability and engagement [MGS*22]. Subsequent work has further explored the design of disease stories in general [MPM24], the use of 3D models and different shaders to communicate pathological changes [MMG*24], and interaction techniques for stories about tumor diseases [MMPM25]. Similar to earlier work, these applications primarily target broad, non-expert audiences.

Characters in Disease Stories. Characters are considered one of the four core components of disease stories, alongside conflict, content, and structure [MPM24]. Characters can strongly influence the framing and structure of a narrative, for example, through

patient-centered storytelling approaches, such as the "Hero's Journey" [MWS*23]. Previous studies have examined various forms of character representation in medical storytelling. For instance, Doré et al. [DGE*24] compared live-action characters, animated cartoons, and celebrity testimonials in a diabetes campaign and found that live-action depictions and celebrity testimonials were generally preferred, whereas animated cartoons were considered less stigmatizing but less engaging. Dasu et al. [DKM24] describe the use of supporting characters and antagonists in narrative visualizations, discussing varying levels of visual abstraction, ranging from abstract depictions to realistic human representations. Recent approaches have also explored semi-automated character development using AI-based generative tools, such as Leonardo AI, to create realistic depictions based on patient-related data [MGB*25, BGPM23]. Mittenentzwei et al. [MWS*23] compared medical stories featuring no explicit main character, a patient protagonist, and a physician protagonist. Their results suggest slightly higher engagement for patient-centered stories, but they did not investigate audience reasoning patterns or additional roles.

3. Exploratory Workshop Study

This section describes the design of our exploratory workshop study, including its goals, procedure, materials, and participant characteristics.

Goals. Many existing narrative medical visualizations are designed based on literature, expert assumptions, or publicly available materials; however, there has been little direct involvement of the intended audience in the design process. The goal of this study is to enhance our understanding of how participants interpret and select roles and character representations in medical stories. Specifically, we investigated which roles (e.g., physician, patient, or relative) audiences find most relevant or interesting, and how these roles should be represented visually in a narrative visualization (e.g., realistically or cartoon-like). Participants were asked to make these decisions from their own perspective by considering which type of character would be most effective for themselves if they wanted to learn about a medical condition. In other words, they were asked to create a character representation they would personally prefer in a medical story. Our additional interest was in the relationship between these decisions and the selected medical context or disease. We see this workshop as a basis for future workshop studies and design processes by identifying potentially missing roles, preferred representation styles, or patterns.

Process & Materials. The workshop study consisted of three sessions, each with ten participants, conducted within one week. Figure 1 provides an overview of the workflow showing our two-phase approach.

Each session began with an introduction to narrative visualization, using examples of medical stories and different narrative perspectives (see Figure 1.1). We presented a narrative visualization about liver cancer, followed by seven short medical stories about other widely known diseases collected from online blogs and other

public sources, such as hopkinsmedicine.org.[†] Participants then began the exploration phase of the workshop by selecting a medical condition on which to focus their story, and providing a brief explanation of their choice. For that, we prepared a set of predefined disease cards to support participants during the workshop and provide a common starting point for the storytelling tasks (see Figure 1.2). The selected diseases represent a broad range of categories frequently addressed in medical communication, including mental illnesses, cardiovascular diseases, tumor-related diseases, and chronic conditions. We focused on diseases widely known to the general public to ensure participants could easily relate to the topics. The diseases shown in the introductory examples were included in this set of disease cards. We also provided blank disease cards for participants to select and describe another disease of personal interest or relevance.

Next, participants chose a preferred role for the stories' protagonist and explained their reasoning. To that end, we provided a selection of roles commonly found in literature and online articles, including those of the physician, patient, and relatives (see Figure 1.3). We also asked for additional ideas for roles that would interest participants.

After selecting a role, the participants explored different visual representation styles for the characters, including realistic, semi-realistic, cartoon-like, pictographic, and voice-based representations (see Figure 1.4 for an example of the male physician). They could select from predefined examples or sketch and describe their own character ideas. The visual representations were created using an OpenAI image generator model (DALL-E 3). All prompts shared a common base structure to ensure consistency across roles and visual styles:

[Style] + [Role] + [Clothing] + [Constraints] + centered, front view, neutral pose, plain background, no text, no additional objects

This modular setup, inspired by Budich et al. [BGPM23], allowed us to systematically vary visual abstraction and character role while maintaining comparable compositions across the generated representations. The relevant modifiable components for character creation are listed in Table 1.

In the evaluation phase of our workshop, participants reflected on their selections by completing a questionnaire assessing the trustworthiness, credibility, impartiality, and empathy of their chosen character representations. These evaluation criteria were informed by prior work on characters in medical narratives [MGB*25] and public health communication [Cum14, Dum21], which highlights trustworthiness, credibility, and empathy as important qualities of characters in medical storytelling, while more strongly associating impartiality with medical expert perspectives. Participants could also freely include other selection criteria such as authenticity or personal aspects they considered relevant for their decision-making. Additional free-text fields enabled them to explain their choices further and provide comments or reflections. For the first phase of the study, participants could choose as many roles and visual styles as they wanted. For the second phase, in which the

Component	Variants used in prompts
Style	{photo-realistic, semi-realistic, stylized digital illustration, cartoon, minimalist pictogram}
Role	{male physician, female physician, young adult male (≈ 25 years, patient/relative), older adult male (≈ 60 years, patient/relative), young adult female (≈ 25 years, patient/relative), older adult female (≈ 60 years, patient/relative)}
Clothing	{white lab coat with stethoscope (physician), casual clothing (patient, relative)}
Constraints	{abstraction controls such as minimal detail (cartoon) and reduced facial detail (pictograms)}

Table 1: Prompt components and their corresponding variants used for character generation. Role-specific prompt components are indicated in parentheses; for example, age variants were applied only to patient and relative characters, not to physicians.

character was to be described in more detail, they were asked to focus on one main character. Throughout the workshop sessions, researchers accompanied the participants. Questions were answered, and decisions and explanations were further discussed to encourage reflection and clarify reasoning. The complete set of workshop materials is included in the supplemental materials.

Participants A total of 30 participants took part in the study (see Table 2). Participants were recruited from a public event and from the authors' extended social environments. The group was gender-balanced and, overall, slightly younger, with half the participants under 34. Most participants reported having relatively little medical expertise, while storytelling experience was more evenly distributed.

Age	#	Gender	#	Self-Ass.	Med. E.	St. E.
18–25	4	Male	16	very low	6	9
25–34	11	Female	14	low	12	6
35–44	6	Diverse	–	medium	6	5
45–54	3			high	4	6
55–64	5			very high	2	4
65+	1					

Table 2: Demographic information and self-reported experience levels of the workshop participants ($N = 30$). Med. E. = medical experience; St. E. = storytelling experience. Experience ratings were collected using five-point Likert scales. Age: $M = 39.0$, $SD = 14.6$ (range: 22–83)

[†] [John Hopkins Medicine: COVID-19: Ethan's Story](https://hopkinsmedicine.org)

4. Results

In this section, we present the results of our exploratory workshop study. We address the research questions by analyzing the participants' role selections, visual style choices, and subsequent evaluations. We also derive underlying patterns in their reasoning.

4.1. Disease Selection

The disease selection provided context for the workshop, enabling participants to base subsequent decisions on character and visual style on a medical scenario that was personally meaningful or relevant to them.

Of the 30 participants, 19 selected a disease card from the provided options, while eleven entered self-defined medical conditions, such as a brain tumor, lymphoma, aneurysms, or scoliosis. Tumor-related diseases were the most frequently selected category (twelve selections), followed by stroke (four selections), depression (four selections), and heart attack (four selections). Diabetes was selected three times.

Most participants (21) chose a disease that was personally relevant to them. Five of these participants reported being personally affected by the respective condition, while 16 participants based their choice on experiences involving relatives or close acquaintances. The remaining nine participants selected diseases primarily based on general interest, with no personal connection.

These results suggest that *personal experience* and *emotional connection* played important roles in selecting medical contexts for narrative stories (RQ3).

4.2. Character Role & Style Selection

To address RQ1, we analyzed how participants selected and justified narrative character roles and visual representation styles.

Character Role. *Physicians and patients* were selected equally often, with 17 selections each (see Figure 2). Eight participants explicitly preferred a combination of both, indicating an interest in narratives integrating medical expertise and patient experiences.

Notably, male participants tended to select female physician characters (six out of seven selections), while female participants tended to select male physician characters (six out of ten selections). When it came to tumor-related diseases, participants more frequently selected the physician's perspective, which was chosen in eight out of twelve cases.

Participants provided a range of explanations for their role choices (RQ1). One recurring rationale was *identification with the selected character* (eight mentions), where participants chose characters of the same age or gender. Another three participants emphasized *sympathy and emotional accessibility*, describing the selected characters as "friendly" or "pleasant" (three mentions). Some participants justified their choices based on *authenticity* (2 mentions), *trustworthiness* (one mention), or *perceived expertise and seriousness* (three mentions).

Four participants preferred to *combine multiple roles* to provide

more comprehensive information within the story. Another four selected characters that *reflected personal experiences*; for example, they chose characters who resembled someone they knew who had experienced the disease. Those with stronger storytelling experience also emphasized the importance of *representing realistic patient groups* for specific diseases.

One participant expressed interest in adopting a child's perspective to better understand how medical conditions, such as depression, affect younger individuals. This perspective was considered valuable because it could increase awareness and enable more targeted communication in certain contexts.

Character Style. *Realistic visual representations* were selected far more frequently than any other option (19 selections), with an even distribution of doctor and patient characters (eleven selections each). The second most popular choice was the first cartoon style ("Cartoon Low"), selected seven times and relatively balanced between doctor and patient representations. Voice-only representations were selected five times, including four selections of a female physician's voice.

Empathy-related arguments were mentioned most frequently (six times), including descriptions such as "friendly," "emotionally appealing," "pleasant," or "someone expressing compassion". These arguments were associated with realistic (three mentions), cartoon (two mentions), and voice-based (two mentions) representations (RQ1). *Authenticity* (two mentions), *trustworthiness* (two mentions), and *perceived expertise or seriousness* (three mentions) were exclusively associated with realistic representations.

Six participants argued that realistic representations are generally taken more seriously in medical contexts. In contrast, cartoon-like styles were described as creating emotional distance from the topic because they were perceived as artificial or fictional (three mentions). Nine participants either offered alternative reasoning or provided no explanation for their choices.

4.3. Perception of Character Representations

To address RQ2, we examined how participants evaluated their selected character across trustworthiness, credibility, empathy, and impartiality.

When asked to select a primary narrative character, physician and patient selections were again equally frequent, with 14 each, while relatives were selected only twice.

Trustworthiness. Both the physician and patient characters received high overall trustworthiness ratings (see Figure 3). Physician characters were rated slightly more trustworthy overall, receiving fewer medium ratings and more high ratings compared to patient characters. Relative characters were rated moderately trustworthy.

Credibility. Credibility ratings followed a similar pattern. Physician characters were again perceived as slightly more credible than patient characters, although both roles received predominantly high ratings. Relative characters received mixed ratings but were only selected by two participants.

Empathy. Patient characters were perceived as noticeably more empathetic than physician characters. Nevertheless, physician characters also received comparatively high empathy ratings overall. Relative characters were rated highly empathetic but were rarely

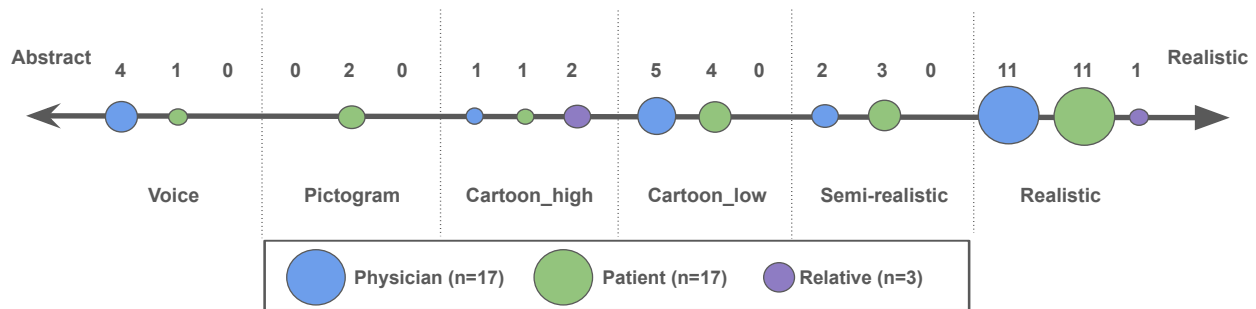


Figure 2: Character role selections across levels of visual abstraction, ranging from voice-only to realistic depictions. Circle size represents selection frequency, and colors indicate character roles (physician, patient, relative). Because participants could select multiple equally appealing styles, the number of style selections may exceed the number of role selections (e.g., 17 physician selections yielded 22 physician-style selections).

selected as the protagonists' role.

Impartiality. Physician characters were perceived as the most impartial narrative role overall. Patient and relative roles were considered substantially less impartial, with relatives receiving the lowest impartiality ratings. However, qualitative feedback revealed that impartiality was often not considered particularly important (18 mentions). Instead, many participants emphasized the importance of *personal experiences, emotional connection, and relatability* within medical stories.

4.4. Additional Qualitative Feedback

To address RQ3, we analyzed participants' qualitative explanations across role and style selections. These insights revealed several recurring, yet sometimes contrasting, perspectives on how narrative medical visualizations could be designed.

One set of comments addressed the use of abstraction versus realism in character representation. Some participants suggested that more abstract representations would be suitable for severe diseases to maintain emotional distance. Realistic depictions, however, were considered more appropriate for less severe or long-term conditions where the narrative focuses more on living with the disease than on acute outcomes. However, other participants argued that, for less severe illnesses, non-realistic or less detailed representations would also be preferable. This indicates that preferences for visual style were not consistently aligned across participants and that the choice of visual style may depend on disease severity.

One participant suggested improving pictographic representations by explicitly depicting symptoms to make the medical situation clearer. However, they noted that such explicitness would be less appropriate for realistic character depictions. These differing expectations point to the varying levels of medical detail that should be embedded in visual representations.

Further feedback addressed the role of narrative structure itself. One participant questioned the necessity of dialog-based storytelling for conveying medical information, and another stated that medical information does not necessarily require a narrative structure. These comments highlight the tension between informational and narrative expectations in medical visualization design.

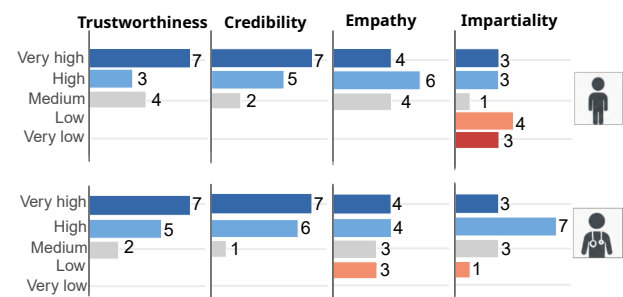


Figure 3: Likert-scale ratings for patient (top) and physician (bottom) characters across trustworthiness, credibility, empathy, and impartiality. Bar length shows response frequency, and colors indicate rating levels from very low (red) to very high (blue). The relative condition was excluded due to a low number of responses ($n = 2$).

5. Discussion & Design Implications

Based on the quantitative and qualitative findings, we discuss broader observations about audience-centered character preferences and their implications for designing narrative medical visualizations (RQ3).

Physician and patient as dominant and complementary roles. Throughout our study, participants primarily selected either the physician or patient as the protagonist. Only a few cases involved an alternative role, such as that of a relative. No entirely novel character roles emerged from the data, suggesting that these two roles constitute the primary interpretive framework for approaching medical narratives in this context.

Some participants combined physician and patient in their choices. In these cases, the two roles were often described as complementary rather than interchangeable. The patient was associated with personal experience and emotional grounding, and the physician was associated with expertise and a more "objective" or structured viewpoint. Some interpretations viewed combining the two roles as a way to balance or mitigate the limitations of a single protagonist.

While these observations are preliminary, they suggest that narrative medical visualization could benefit from considering the physician and the patient as paired concepts rather than as isolated or competing roles.

Character role and visual style as a combined entity.

Throughout the workshop, participants rarely discussed role and visual representation style as separate decisions. Instead, feedback often described the selected character as a composite entity in which the role, appearance, and perceived personality were closely intertwined. Statements such as "looks authentic", "feels pleasant", or "looks like someone I know" referred to both the selected role and its visual representation. This suggests that character role and visual style may not function as isolated design dimensions in narrative medical visualizations but rather as interconnected components that shape an overall narrative impression. Future systems and workshop formats may therefore benefit from jointly addressing role and representation during character design and evaluation processes.

Realism and emotional distance. Participants showed a strong preference overall for realistic character depictions, selecting them substantially more often than cartoons, pictograms, or voice-only representations. Qualitative feedback suggests that realistic depictions are often associated with seriousness, authenticity, credibility, and trustworthiness. At the same time, participants described abstraction as potentially beneficial for emotionally difficult or severe diseases, as a way to create distance from the topic. Interestingly, the only participants who selected pictogram-based representations were those personally affected by the disease in question. These findings suggest that realism is not universally preferable but rather depends on emotional proximity, disease severity, and personal experience. Consequently, future narrative medical visualizations may benefit from offering adjustable levels of abstraction depending on the narrative context and audience needs.

Similarities across age groups. Despite the slightly younger participant population, we observed only minor differences across age groups. Older participants showed a slight tendency toward physician-centered stories, which may reflect differences in how medical authority and expertise are perceived across generations. Overall, role preferences, reasoning patterns, and character evaluations remained consistent across age groups and appeared to be more strongly connected to general needs in medical communication, such as trust, relatability, and understandable representations, than to age. Since many participants selected diseases based on personal experiences, these experiences may be a more relevant factor in character preference than demographic characteristics. These observations require validation in larger, more diverse populations, but may indicate that preferences for character roles and representation styles are relatively stable within non-expert audiences.

6. Limitations

This study is exploratory in nature and, therefore, subject to several limitations. First, the sample size is relatively small ($n = 30$), which limits the generalizability of the findings. While the participant group was diverse in terms of age, gender, and prior experience, it does not allow for statistically representative conclusions about broader population-level preferences. Also, the workshop was conducted in a simplified format: Participants did not work with a fully developed narrative but instead engaged in structured tasks focused on isolated design decisions (e.g., disease selection, character roles, and visual style). While this allowed for controlled comparison across participants, it may not fully reflect how character preferences emerge within complete narrative medical stories. Another limitation concerns the predefined design space used for character selection. To keep the workshop manageable, participants could choose from a limited set of character roles and visual abstraction levels. While this covered a broad range of commonly used representations, additional character attributes such as visual appearance and other personal characteristics may also influence audience preferences.

7. Conclusion & Future Work

In this paper, we present the results of an exploratory workshop study that investigated audience-centered preferences for character roles and visual styles in narrative medical visualizations. Our findings indicate that participants often select diseases based on personal or emotional relevance and prefer realistic character representations. Our results also suggest that perceptions of trustworthiness, empathy, and credibility are closely tied to narrative roles and visual styles. Participants tended to treat these as a combined design entity rather than as separate dimensions. Overall, the study provides initial insights into how non-expert audiences reason about and justify character-related design choices in medical storytelling contexts.

Future work should compare these findings with character and style choices in existing narrative medical visualizations to assess alignment with current practices. Additionally, larger, more diverse samples, as well as longer workshop formats, could help us better understand preferences within richer narrative contexts. Future work could also expand the scope of the workshop beyond character design to examine other components of narrative medical visualizations, such as preferred story structures, narrative content, and appropriate visualization techniques. Combining workshops with members of the target audience and visualization experts from different fields may further support the development of audience-centered design and inspire new visualization concepts for medical storytelling. Further research could also examine how variability in character representations (e.g., different styles or demographic attributes) affects perception and how disease selection influences narrative preferences and design choices.

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