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Acceptance of Medical Artificial Intelligence and the Effect of ChatGPT

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Abstract

Large language models (LLMs) such as ChatGPT have rapidly increased public exposure to artificial intelligence (AI), raising critical questions about how such experiences influence trust and acceptance of AI applications. We analyzed nationally representative data from 10,035 U.S. adults in the Understanding America Study to examine trust and acceptance of medical AI. In the first survey, respondents indicated whether they had heard of or used LLM-based AI systems that create human-like text. Overall, 47.9% of U.S. adults had heard of such systems and 24.3% had used them. When asked about an AI application in medicine, only 15.1% trusted AI to provide a health diagnosis as much as or more than a human professional or expert. Logistic regression revealed that individuals who had heard of LLMs had 74% higher odds while those who had used LLMs had 90% higher odds of trusting medical AI as much as or more than a human expert. A subsample study of 713 respondents evaluated an AI technology for cervical cancer diagnosis vignette on five acceptance dimensions, with findings indicating relatively high potential and excitement, moderate understanding and trust, and low fear. Prior exposure and use were positively associated with higher understanding, trust, potential, and excitement. The effect of personal use persisted even after controlling for demographics and general trust in medical AI. Together, the findings support the vision of human-AI collaboration to augment clinical decision-making and diagnosis and emphasize the need to study the evolving sociotechnical aspects of AI technology.

Keywords: trust, medicine, healthcare, technology acceptance, ChatGPT, large language model (LLM)

Significance Statement

Public exposure to generative AI, such as ChatGPT, provides a real-world test of how familiarity shapes trust in AI applications, including AI in medicine. In a nationally representative U.S. panel, nearly half of adults had heard of ChatGPT-like systems and one-quarter had used them, yet when asked about trust in AI in medical diagnosis, only about one in seven expressed trusting AI to diagnose illness as much as a human expert. Those with prior exposure or use expressed substantially greater trust in medical AI overall and reported higher understanding, trust, potential, and excitement when evaluating an AI-assisted cancer diagnosis scenario. These findings suggest that real-world encounters with generative AI may foster readiness for AI-enabled healthcare by increasing familiarity, confidence, and nuanced acceptance.

Introduction

Artificial intelligence (AI) technologies are transforming healthcare and medicine at an unprecedented speed and scale (1, 2). At the core is AI's ability to process large datasets and learn algorithms that augment clinical decision-making across many domains (2). As a result, the U.S. Food and Drug Administration (FDA) authorized over a thousand AI/ML-enabled medical devices, with a majority approved in the last three years and focused on imaging and diagnostics (1). Despite famous predictions that AI will completely replace some medical professionals, such as radiologists, AI adoption in healthcare has been slower than anticipated. In fact, systematic analyses raise concerns about effectiveness, generalizability, and unintended consequences (3–5).

Studies of patient perspectives report similar concerns. A recent review indicates that while 75% of patients express notable benefits of AI, most still hold substantial concerns regarding potential risks, lack of human touch and patient autonomy, and transparency (6). Experimental work likewise documents resistance to medical AI compared to clinicians, even when AI is more accurate (7). However, learning about AI advancements can impact trust and future adoption of this technology (8–10).

The introduction of large language models (LLMs) to the general public, such as ChatGPT, led to the fastest adoption of any technology in history, with individuals increasingly reporting use of it for medical issues such as diagnosis (5). This rapid adoption can transform public perception of AI in healthcare (9). First, public perception can shift via the "mere exposure" to widespread coverage of AI in the news and increasing marketing by big tech companies which continuously introduce AI products (8). Second, personal use can increase familiarity and perceived usefulness and ease, which are linked to acceptance (11). These mechanisms intersect with trust, a key antecedent of AI acceptance (12, 13). Accordingly, we examine how exposure to—and personal use of—LLMs relate to trust and acceptance of medical AI. Specifically, we (i) characterize awareness and use of LLMs and general trust in medical AI, and (ii) compare the associations of exposure versus use with diverse elements of acceptance in the case of AI for cancer diagnosis.

Results

AI Adoption and Trust in Medical AI

Among the full sample (N=10035), 47.9% heard of AI that creates human-like text (e.g., ChatGPT) and 24.3% used it. When asked about general trust in medical AI compared to human experts, only 15.1% trusted AI to provide a health diagnosis as much as or more than a human professional or expert. Table 1 presents binary logistic regression analyses predicting trust in medical AI. In the demographic-only model, men and individuals with a college education were more likely to express trust in AI-based diagnosis, whereas older respondents reported lower trust. When exposure to and personal use of AI were included, both variables showed strong positive associations with trust: those who had heard of or used AI were significantly more likely to trust AI for medical diagnosis than those who had not. Gender remained a significant correlate of trust, while age and education did not.

Table 1. Binary logistic regression predicting trust in medical AI diagnosis

	Model 1					Model 2				
	B	*p*	Exp(B)	95% CI		B	*p*	Exp(B)	95% CI	
Age	-0.006	<.001	0.995	0.991	0.998	-0.003	0.098	0.997	0.994	1.001
Male	0.379	<.001	1.461	1.306	1.635	0.324	<.001	1.383	1.235	1.550
College	0.171	0.003	1.186	1.06	1.328	0.028	0.652	1.028	0.912	1.158
Heard of AI (vs. not)						0.553	<.001	1.739	1.497	2.019
Used AI (vs. not)						0.636	<.001	1.889	1.581	2.256
Model summary	Nagelkerke R^2 = 0.01; $\chi 2$ (3) = 63.65; p<0.001					Nagelkerke R^2 = 0.02; $\chi 2$ (5) = 128.99; p<0.001				

Note: B= Log Odds, Exp(B) = Odds Ratio, CI = Confidence Interval

Elements of Acceptance of Medical AI

Among a subsample of 713 participants who read a description of medical AI use in cervical cancer diagnosis, participants rated the potential of this AI technology as highest (M = 3.71, SD = 0.89), followed by excitement (M = 3.32, SD = 0.93), trust M = (3.18 SD = 0.84), understanding (M = 3.08, SD = 1.00), with fear being the lowest (M = 2.54, SD = 0.90). A visual representation of the distribution is provided in Figure 1.

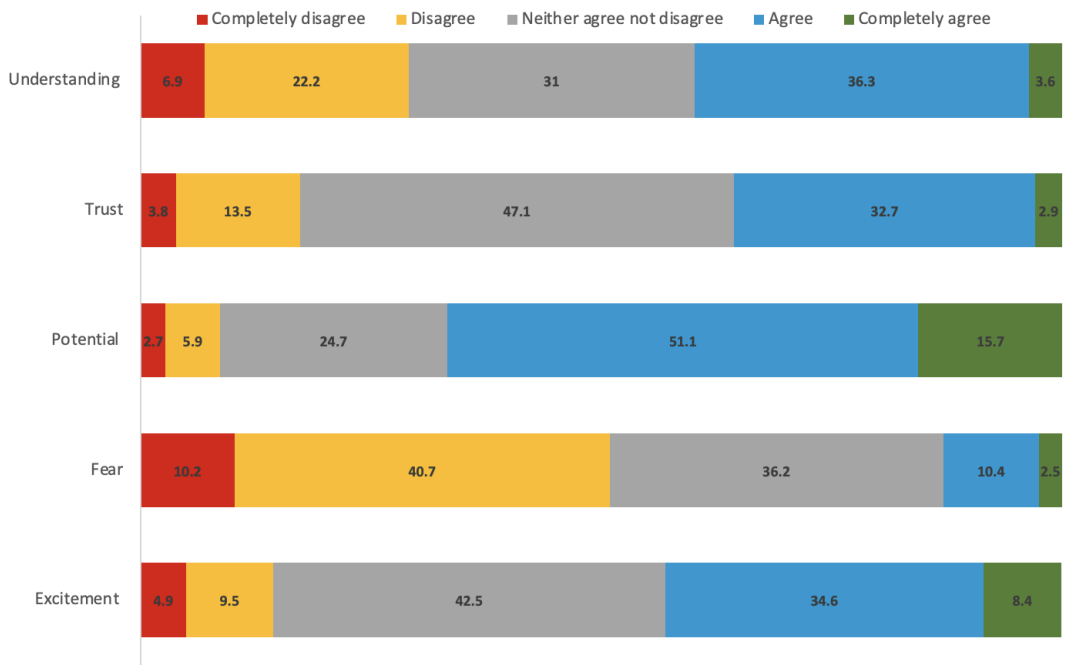

Figure 1. Response distribution across elements of acceptance for AI for cancer diagnosis

The correlation table between elements of acceptance is presented in Table 2. Notably, trust was highly correlated with potential and excitement but only moderately correlated with understanding.

Table 2: Correlations between elements of acceptance of AI in cancer diagnosis

	1	2	3	4
1. Understanding				
2. Trust	0.47***			
3. Potential	0.37***	0.69***		
4. Fear	-0.14***	-0.38***	-0.30***	
5. Excitement	0.33***	0.70***	0.74***	-0.38***

***p<0.001

Predicting Acceptance of AI Cancer Diagnosis

Table 3 presents linear regression analyses predicting the five elements of acceptance for cancer diagnosis. As shown in Table 3, prior experience using AI was a consistent positive predictor of acceptance across multiple dimensions of the cancer-diagnosis vignette. Individuals who had previously used AI reported significantly greater understanding, higher trust, and more excitement toward AI-assisted diagnosis, even after accounting for general trust in medical AI and age, gender and education. In contrast, merely having heard about AI was only weakly associated with perceived potential. Male gender and college education were each associated with higher trust, excitement, and potential, as well as lower fear of AI use in this context, whereas none of the AI-exposure variables significantly predicted fear.

Table 3: Models to predict elements of acceptance of AI in cancer diagnosis

	Understanding		**Trust**		**Potential**		**Fear**		**Excitement**	
	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*	β (95% CI)	*p*
Age	-0.07 (-0.01, 0.00)	0.07	0.05 (0.00, 0.01)	0.22	0.06 (0.00, 0.01)	0.10	-0.05 (-0.01, 0.00)	0.19	0.04 (0.00, 0.01)	0.35
Male	0.03 (-0.10, 0.20)	0.50	0.14 (0.12, 0.36)	<.001	0.13 (0.11, 0.36)	<.001	-0.09 (-0.30, -0.03)	0.02	0.08 (0.01, 0.29)	0.04
College	0.09 (0.03, 0.33)	0.02	0.16 (0.15, 0.40)	<.001	0.22 (0.26, 0.52)	<.001	-0.15 (-0.40, -0.12)	<.001	0.20 (0.24, 0.52)	<.001
Heard of AI	0.05 (-0.09, 0.28)	0.30	-0.04 (-0.22, 0.08)	0.36	0.10 (0.03, 0.34)	0.02	0.03 (-0.10, 0.23)	0.46	0.04 (-0.10, 0.23)	0.43
Used AI	0.13 (0.08, 0.56)	0.01	0.10 (0.01, 0.40)	0.04	0.19 (0.21, 0.61)	<.001	-0.04 (-0.29, 0.14)	0.49	0.15 (0.12, 0.55)	0.00
Trust in Med AI	0.13 (0.15, 0.54)	<.001	0.16 (0.19, 0.51)	<.001	0.11 (0.09, 0.42)	0.00	-0.07 (-0.34, 0.01)	0.07	0.12 (0.13, 0.48)	<.001
Model summary	$F(6,712)=6.68$, $p<0.001$; $R^2=0.05$		$F(6,712)=13.07$, $p<0.001$; $R^2=0.10$		$F(6,712)=18.25$, $p<0.001$; $R^2=0.13$		$F(6,712)=5.44$, $p<0.001$; $R^2=0.04$		$F(6,712)=13.06$, $p<0.001$; $R^2=0.10$	

Note: CI = Confidence Interval

Discussion

Our results align with prior evidence of resistance to medical AI relative to human experts (7), reflecting a preference for human judgment in medical diagnosis. However, when evaluating a specific AI-assisted cervical-cancer diagnosis scenario, respondents familiar and experienced with AI expressed greater perceived potential and excitement, moderate understanding and trust, and lower fear. Nevertheless, substantial skepticism persists, consistent with documented patient-perceived barriers to AI acceptance (6). Taken together, this gap between general trust and technology-specific acceptance indicates support for the vision of a human–AI collaboration model in which AI systems inform, rather than replace, clinical decision-making.

Our findings also indicate that trust and acceptance of medical AI are shaped by the broader exposure to AI technology and interaction with it. As expected, the effect of personal use of AI was stronger than the effect of mere exposure. Specifically, those who had heard of LLMs had 74% higher odds of trusting medical AI at least as much as a human expert, and those who had used them had 90% higher odds. Moreover, exposure to and personal use of AI attenuated the effect of demographic variables, such as gender and education, on trust and acceptance. When evaluating trust, understanding, and potential of the specific cancer diagnosis scenario, the effect of personal use remains significant even after adjusting for general trust in AI for medical diagnosis.

As the use of AI in medicine and healthcare continues to expand, it is crucial to keep studying the evolving sociotechnical aspects of this technology, especially those shaping trust and acceptance (13). Beyond our findings, extensive research now demonstrates that exposure and use of AI shapes attitudes toward this technology, although not always in predictable ways (8–10). Public familiarity with LLMs may be diffusing faster than rigorous clinical evidence of AI accrues, underscoring the need to align technological advancement with public perception. Further research on patient perspectives of AI in healthcare and medicine is needed to fully leverage the benefit of this technology for better health and public good.

Materials and Methods

The data were collected as part of the Understanding America Study (UAS), a nationally representative, probability-based panel of U.S. residents aged 18 and older (14). Data were collected in both English and Spanish. For the purposes of this study, two UAS datasets were merged: UAS survey #607 (15) and UAS survey #610 (10) that were conducted in two different time points in 2024. Both surveys were not designed to exclusively focus on medical AI, but rather on AI adoption in daily life and acceptance and trust of different scientific advancements and AI technologies.

Participants

In Survey 1, a total of 10,413 American adults completed study variables. After applying poststratification weights that aligned the sample characteristics to the U.S. population the sample size was 10,035, with participants' age range from 18 to 103 years (M = 49, SD = 17.14), 48.9% male and 35.6% college

educated. A subsample of 713 participants (age range: 18–93 years; M = 52.90, SD = 16.16; 37.3% male, and 44.9% college educated) completed both surveys with no missing data on the study variables.

Measures

Survey 1 (UAS 607): Use of AI Technology and Trust in Medical Diagnosis

In Survey 1, AI has been defined as: *"Artificial Intelligence (AI) refers to the ability of a computer or machine to perform tasks that typically require human intelligence, such as learning from experience, solving problems, and making decisions"*. Afterwards, participants' prior experience was assessed with the following question: "Have you heard about or used AI applications that create human-like text or code, such as ChatGPT, Google Bard/Gemini, or Bing Chat?" Responses: "I have never heard about them," "I have heard about them but never used one," "I have used them," and "I don't know" - were recoded into binary variables indicating AI use (vs. not) and AI awareness (vs. not), with the comparison group including those who had not heard of AI or were unsure.

Trust in medical AI was measured by the question: "How much would you trust AI giving a health diagnosis?" Responses: "Less than a human professional or expert," "As much as a human professional or expert," "More than a human professional or expert," or "Not sure" - were recoded into a binary variable indicating trust in AI as much as or more than a human expert (vs. less or not sure).

Survey 2 (UAS 610): A Vignette Study of AI for Cancer Diagnosis

In Survey 2, participants read the description of a medical AI development based on ScienceDaily news reporting: "*A research team has developed a computer algorithm that can analyze digital images of a woman's cervix and accurately identify precancerous changes that require medical attention. This artificial intelligence (AI) approach, called automated visual evaluation, has the potential to revolutionize cervical cancer screening, particularly in low-resource settings."* Afterwards, participants rated five items on a scale from 1 (completely disagree) to 5 (completely agree): (a) understanding – "I have a good understanding of this development"; (b) trust – "Based on this information, I trust this development"; (c) potential – "This development has the potential to help the human race"; (d) fear – "Reading about this development makes me afraid" and (e) excitement – "Reading about this development makes me excited."

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