Are we missing the 'care' in Healthcare AI?: The Importance of Affect in Doctor-Patient Interactions

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***Abstract*—The development of artificial intelligence (AI) systems for use in healthcare settings is said to have the potential to transform clinical care through increased efficiency, accuracy, and personalization. At the same time, there are many concerns about the ethical and social implications of deploying such technology including unreliability, inaccuracy, algorithmic bias, and privacy. However, current critiques of healthcare AI rarely mention the role of emotions in clinical care and its implications for AI development, which I argue is equally important to consider. In this paper, I first outline the role of emotions, especially empathy and trust, in building patient-doctor relationships, which helps improve patient outcomes and the clinical decision-making process itself. I argue that affects are crucial to the doctor-patient relationship and thus crucial to consider when building healthcare AI systems. From here, I outline two potential ways to move forward. First, AI researchers could incorporate emotions when building clinical AI to better mimic human clinicians. However, emotions can also have negative consequences in clinical contexts, and it is unclear whether we can separate the good from the bad. Furthermore, current affective computing systems rely on a simplistic model of emotions and its applications to healthcare focus on a narrow set of specialties. Alternatively, researchers could instead focus efforts on developing AI for non-clinical domains (e.g., administrative tasks, decreasing waiting times), tools that help enhance the human doctor-patient relationship rather than replace it.**

***Index Terms*—affective computing, artificial intelligence, healthcare AI, emotion AI, emotional intelligence, doctor-patient relationship, clinical decision-making, clinical AI, AI ethics**

I. Introduction

'Healthcare AI' refers to the subset of artificial intelligence (AI) technologies that aim to improve the medical field across various domains including diagnostics, personalized medicine, treatment protocol, and patient monitoring and care. Recently, there has been a proliferation in the development of AI systems for use in clinical decision-making and it is said to have the potential to transform clinical care through increased efficiency, accuracy, and personalization [1]. For example, IBM's Watson Oncology and Microsoft's Project Hanover predict the most effective cancer treatments for patients by analyzing medical literature [2]. Similarly, Tencent's AIMIS is said to have the ability to accurately diagnose diseases within seconds [2]. More recently, medical chatbots, such as OpenAI's DxGPT and Google's Med-PaLM-2, have started being deployed in hospitals to answer patient's questions and help diagnose rare diseases [3], [4]. Furthermore, corporations like Hippocratic AI are developing foundation models to enhance medical diagnosis, and AI-simulated healthcare workers that converse with patients to gather medical information and answer questions [5].

However, despite the potential benefits of such technologies, there are currently many ethical and societal concerns. Current healthcare AI models are unreliable, such as Microsoft's BioGPT which, when asked questions about medicine or biology, will provide pseudo-scientific or inaccurate answers (e.g., claiming that vaccines can cause autism) [6]. Other models further increase health disparities due to algorithmic bias - for example, a widely used prediction algorithm used to identify and support patients with complex health needs exhibited racial bias [7]. More recently, large language models (LLMs) have been shown to propagate race-based medicine [8], and their limitations in clinical settings have not been thoroughly researched despite their increased development and use [9]. Lastly, there are also privacy concerns over the health data that is used to train such AI models - in October 2021, for instance, the protected and sensitive heath data of over 1.35 million individuals was breached via Broward Health [10].

Now, even if we were able to solve these issues of diagnostic AI systems, and had "better than human" accuracy, would this result in a positive transformation to the healthcare system? I argue that this is not the case. Ignoring issues of accountability[1], providing patients with a diagnosis is not the sole purpose of a doctor's appointment. Recent shifts from the paternalism mode of care, which prioritized medical expertise and objectivity, to patient-centred care have resulted in an increased value of "relational moral competency" including empathy, compassion and trust [11]. Furthermore, trust between the patient and doctor is dependent on the doctor's competency as well as their interpersonal and emotional skills; and increase in trust has been shown to increase treatment adherence and improve health outcomes [1]. Hirmiz also states that empathy is "essential to providing deep care" which goes "beyond the mere fulfillment of medical tasks" [2]. Thus, the priority for healthcare practitioners is to understand the patient's perspective and guide them to make the right decision based on their needs, desires, and ideals, which are deeply

[1]Who is held accountable when healthcare practitioners follow the recommendations of AI, or when they choose to override its recommendation?

influenced by their affects [1].

This paper explores the importance of affects in clinical care, and how it should impact the development and integration of AI systems in healthcare. In section II, I provide background on the role of affects in clinical practice by highlighting the inseparable nature of cognitive and emotional processes in holistic patient care. Emotional understanding through empathy and compassion can help deepen the doctor-patient relationship, which can result in improved clinical decision-making. This is supported by empirical evidence that high emotional intelligence in physicians results in better outcomes for patients. However, some affective states experienced by physicians can have a negative effect on patient outcomes. Thus, emotions greatly impact the field of healthcare, clinical decision-making, and the patient-doctor relationship in complex ways. In section III, I assess how the integration of diagnostic AI can potentially impact the emotional aspects of healthcare. More specifically, I outline why a purely rational AI system that influences clinical decision-making would result in poorer health outcomes, regardless of whether it (a) replaced physicians or (b) was used as a tool by physicians. Finally, in section IV, I propose two ways forward to mitigate the aforementioned concerns in healthcare AI development: (a) shifting our focus to instead develop emotion AI systems for clinical decision-making or, alternatively, (b) developing AI tools for non-clinical tasks in healthcare so that human physicians can focus on providing holistic patient care. I ultimately argue that, while we may at some point in the future develop emotionally intelligence healthcare technologies, we should realize the limitations of current healthcare AI that are created for diagnostic purposes.

II. The Role of Affects in Clinical Care

Historically, medicine was believed to be a purely cognitive field, based on objectivity and technical expertise [1], [12]. Here, clinical decision-making was solely in the hands of the physician based on what they believe to be in the patient's best interests [13]. This paternalist mode of care completely disregarded the doctor-patient relationship and the patient's values, understanding, and autonomy [13]. However, recent shifts to patient-centered care have highlighted the importance of shared clinical decision-making between the patient and doctor to provide personalized care. Now, the "care concept" includes a holistic approach that considers the entire patient, not just the pathological aspects of the body or mind [14]. This means that the physician does not solely rely on symptoms and health history to care for the patient but focuses on communicating with the patient to learn about their values, needs and desires. This holistic approach thus requires healthcare practitioners to do emotional work and appraise patients' affects (e.g., pain, joy, anxiety, sadness, hope, loss, and anger) on a daily basis [15]. This is supported by decades of research in social and cognitive psychology which state that emotions play an important role in the diagnostic and clinical decision-making process [12].

A. Inseparable nature of affects and clinical care

As Paul Burcher states, "The clinical encounter, or the relation between physician and patient is perhaps unique in that the exchange and processing of emotionally laden information must often occur rapidly and between two people who may be near strangers to one another" [16]. The foundation of good healthcare lies in the inseparable nature of cognitive and emotional processes. As Jotterand and Bosco argue, clinical judgments cannot be reduced to algorithmic decisions, as they require complex integration of medical knowledge with emotional understanding [17]. This integration is essential because decisions in healthcare settings emerge from the interplay between emotion-based and cognitive-based processing, with affect playing a crucial role in complex decision-making [12], [15]. Thus, emotions cannot be separated from the clinical decision-making process. If a clinician were to suppress their emotions, it may result in them missing or distorting clinical evidence needed to make a sound clinical decision [16].

One of the key reasons affects are an integral part of healthcare is because clinical decision-making is much more than diagnosis, it is "the complex synergy between science, art and virtue" [17]. Take, for instance, Verghese's account of 'bedside as a ritual': "the physical exam, in which physicians lay their hands on their patients, is much more than a means of diagnosing disease; rather, it is a transformative ritual that signifies the physicians' care for their patients and their commitment to be with them through their illness" [17]. Similarly, hospital managers emphasized that "physicians are not just there to provide a diagnosis but to fully engage with the patient, offering consolation, consultations, and more" [18]. In fact, some patients interact with the healthcare system solely to have a conversation, as noted by a physician: "They come to vent, and then we find some psychological component in a good percentage of them. I believe it's important for them to sit down with the physician, have a chat." [18].

These ideals are showcased in the shared decision-making (SDM) paradigm, where patients and doctors are equally involved in the decision-making process [13]. Here, the physicians are experts in medicine while patients are experts in their own personal values and preferences [13], [19]. This paradigm emphasizes respect for patient's autonomy and self-determination, allowing them the right to direct their own care, rather than having physicians decide what is best for them - the current gold standard in medical practice [11], [13]. This attention to patient's values is directly related to their affects, since emotions are largely influenced by a person's desires, goals, and needs [17] . Thus, a physician must be able to appraise patients' affects to fully understand their desires and values. Another key component of SDM is informed consent, which is defined as the "disclosure of appropriate information to competent patients" such as the potential risks and benefits of a procedure, possible alternatives, prognosis, and consequences of each clinical decision [13]. The 'appropriateness' of information relayed to the patient is determined by the patient's affects and physician's appraisal.

For instance, palliative care would only be an appropriate alternative to suggest in place of treatments for a terminal illness if the patient expressed a goal to that effect and the physician picked up on it. Therefore, healthcare cannot be reduced to scientific knowledge, and good care must include "humanistic conditions" including empathy, compassion, and emotional intelligence [17]

B. Impact of physician's affect in clinical practice

So far, I have largely spoken about the importance of patient's affects in healthcare. However, physicians are also human and come to work with their own affects that influence their clinical judgements and reactions. Liu et al. describe the various impacts of physician's affect in clinical reasoning [12]. They divide it into 4 categories: temperament, attitude, emotion, and mood. Temperament and attitude are long-term affective states and thus can have "broad impacts on patients and/or clinical reasoning" [12]. For instance, if a physician experiences positive affect toward elderly people in general (i.e., a positive attitude), then when they meet an elderly patient, the patient will be cast in a more positive and favorable light, and the physician might pay more attention to their clinical presentation[12]. On the other hand, if the physician had a negative attitude towards elderly patients, they might instead cast a negative and unfavourable light onto an elderly patient potentially leading to premature closure (where less time is allocated to diagnosis) [12]. Both scenarios outline the impact of the physician's affects towards patients on clinical decision-making, for better or worse. Physician's affects can also be influenced by hospital and system-level factors, and have been shown to trigger predominantly negative emotions [20].

Generally, it has been noted that physicians' positive affects lead to positive consequences for patient care, whereas negative affects lead to negative consequences. For example, positive affect can lead to better clinical information processing and efficient reasoning [12]. Furthermore, physicians are more likely to go "beyond the assigned task" of diagnosis and display holistic and integrative thinking when they are experiencing positive affects [12]. A study found that anesthesiologists who reported experiencing more positive affects prior to the study were quicker to detect changes in the patient's condition and initiate necessary interventions [12]. On the other hand, negative affects such as anger, frustration, or irritation, may hinder clinical information processing leading to altered clinical reasoning [12]. A survey found that physicians interacted less with their patients, wrote more prescriptions, and ordered more tests if they were in a negative mood – the inverse was found for physicians in a positive mood [12]. In fact, healthcare disparities amongst marginalized populations (e.g., patients with mental illnesses, substance-use disorders, or racial minorities) have been found to be partially due to affective factors [12].

However, there are also many exceptions to the rule. Some positive emotions have been shown to decrease the amount of information gathered, whereas negative emotions have been shown to increase information-gathering and attention to specific details [15]. A physician's positive affects could lead to over-testing and over-treatment of patients, while also decreasing their confidence that a patient is suffering from a serious illness [12]. Inversely, negative affects such as guilt or shame (perhaps due to previous negative clinical outcomes) could lead to the physician spending more time with the patient, potentially leading to better health outcomes [15]. Similarly, Appraisal Tendency Theory suggests that a negative appraisal that evokes fear is more likely to lead to deliberative and risk averse decisions and behaviour which, in the context of healthcare, lead to better clinical decision-making [15].

Thus, physician's affective states play an intrinsic role in clinical decision-making and patient safety in complex and unexpected ways. Emotions can lead to better or worse outcomes, depending on the specific context, and is not as straightforward as one might think. Many healthcare providers are aware of the risk of emotions negatively impacting their clinical decision-making, and employ various emotional regulation strategies [20]. However, despite the potential negative impacts, some scholars state that a clinician should not detach from emotions but "acknowledge and incorporate them constructively to provide the best possible care" [16]. This is explored more in the following section on emotional intelligence.

C. Benefits of emotional intelligence in clinical practice

There is also empirical evidence that emotional intelligence (EI) in physicians improves clinical practice. Emotional intelligence broadly involves the "perception, processing, regulation and management of emotions" [21]. There are many debates about the exact definition of EI, as well as whether it is an inherent, unchangeable personality trait or an ability that can be learned [21]. One definition of EI states that it is "the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth" [16]. In clinical practice, EI is thought to be an important skill for healthcare providers due to the need for careful management of patients' emotions [21]. In fact, EI has been shown to help students in acquiring interpersonal and communication skills, one of six core competencies in the Accreditation Council for Graduate Medical Education (ACGME) in the USA [16]. The ability to have direct access to implicit affective processes is crucial for effective treatment – an emotionally intelligent physician will be able to connect with the patient in order to communicate effectively, resulting in quality care [16]. Moreover, patients prefer to engage with physicians who are both competent and have the right inter- personal and emotional skills [1].

EI has also been shown to benefit physicians themselves, especially those who seek to practice medicine 'mindfully' [16]. According to Feldman, "The mindful physician notes the sadness, fear, joy, anger, regret, and other emotions that inevitably arise in the day-to-day practice of medicine." [16].

Thus, "only by becoming aware of these emotions can the physician seek to understand and manage them in a way that will promote personal and professional growth" [16]. Similarly, a study on the feelings of emergency department physicians found that physicians commonly used a variety of emotional regulation strategies [20].

Therefore, the examined benefits of emotional intelligence highlights that, while physician's emotions might lead to varying health outcomes, their ability to appraise patient's emotions and regulate their own leads to overall better clinical decision-making and patient care.

D. Empathy and compassion as core elements of good medical care

Empathy can be defined as "a complex imaginative process in which an observer simulates another person's situated psychological state (both cognitive and affective) while maintaining a clear self-other differentiation" [22]. In healthcare, empathy in the "appropriate amount" can be extremely beneficial in decision-making and for the emotional, mental, as well as the physical well-being of patients [2]. Irving's three-dimensional mode of empathy proposes that "the doctor has to understand the patient's world (cognitive), feel with the patient (affective) and communicate this understanding with the patient (behavioural)" [22]. Similarly, according to Mercer, empathy in clinical situations involves 3 actions: (a) understanding the patient's situation, perspective and feelings (and their attached meanings); (b) communicating that understanding and checking its accuracy; and (c) acting on that understanding with the patient in a helpful (therapeutic) way [22]. Empathic clinicians can more effectively gather vital information from patients, which subsequently influences both the quality of care they deliver and the overall medical outcomes [2]. For instance, empathy has been shown to decrease patient anxiety, which is associated with physiological improvements in patients with various illnesses [2]. Inversely, a lack of empathy for some patients, usually ones who are further in terms of social proximity, can lead to partiality and biased clinical decision-making [2].

On the other hand, compassion involves both sensitivity to one's suffering (i.e., empathy) and the commitment to try to prevent or alleviate said suffering [1], [23]. It could be defined as "a deep feeling of connectedness with the experience of human suffering, requiring intimate knowledge of the experience of others, evoking a moral response to the recognized suffering that results in caring that brings comfort to the sufferer" [14]. In medicine, compassionate caregiving is an expectation for healthcare providers, and consists of addressing the patients physical symptoms alongside their "emotional and psycho-social needs" [14], [23]. Psychological research has demonstrated that experiencing compassionate interactions improves human health [23]. Notably, perception of compassion differs over genders and amongst cultures, such as the African philosophy of ubuntu or the Buddhist maitrî, and can lead to different understanding of the emotion in relation to healthcare [23].

Physicians' ability to be empathetic allows them to understand and share patients' feelings and perspective which, in turn, increases the patients involvement in the decision-making process [1]. Compassion is instigated by this empathetic engagement with the patient, leading to the desire to help [1], [16]. The patient's belief and confidence in the professional's competency, understanding and desire to help is what underpins patient trust, which has been shown to increase treatment adherence and improve health outcomes [1]. Thus, emotions such as empathy and compassion help improve clinical decision-making and foster trust in the doctor-patient relationship.

E. The therapeutic clinical relationship between doctor and patient

The therapeutic clinical relationship can be defined as "the interaction of the patient with the medical provider in the professional setting with the intent of improving patient care", and greatly impacts the shared clinical decision-making process [18], [24]. As Kingsford and Ambrose state, "One must be able to interact and treat the patient and not just the disease process" [24]. Take, for example, a patient speaking about their relationship with their doctor: "The friendship that is built over the years is essential because I have been with this physician for twenty years, and I simply feel like... When I come to her, it's like talking to a friend – we chat a little, laugh, and then I start talking about my [health] problems" [18]. Inversely, the lack of a significant clinical relationship can adversely impact the patient, as is the case with Mrs. Jones, a resident in an aged care facility whose clinical nurse, Mandy, recently left the facility. She says: "I cried and cried. People didn't seem to understand how important she had been to me. I've no one to talk to now. They just rush in and out and get things over with as quickly as possible... I feel so worried about how the end will be and it's worse when I've no one to talk to." [2]. Clearly, the relationship between the patient and their healthcare provider is deeply valued and extremely important for patient care. The emotional dimension of a clinical consultation helps in the formation of a "robust therapeutic relationship", and dismissing that aspect can lead to inferior patient outcomes [16].

The therapeutic relationship is dependent on the existence of mutual trust and knowledge between both parties which relies on the clinician's empathy and compassion [16], [24]. Trust is built through several factors: (a) the patient must have faith in the doctor's competence, (b) the doctor must know and understand patient's hopes and beliefs, and (c) the doctor must trust that the patient is, to the best of their abilities, accurately reporting symptoms. The clinician must also be able to empathize with the patient's experiences, concerns, and goals while also expressing this to the patient in a compassionate manner [24]. Loyalty between both parties is also crucial for the development of the therapeutic relationship – both the doctor and patient have a commitment to never abandon or disregard the other's wishes [24]. These principles rely on the physician's ability to both appraise and

express emotions to a patient. The therapeutic relationship also improves patient satisfaction (which is deeply connected to the patient's affective state), and has been shown to improve symptom recovery, adherence with treatment regimens, and follow-up visits [24].

III. Potential Impacts of AI on the Emotional Aspects of Healthcare

Now that I have covered the role and significance of emotions in the field of healthcare, let us consider how AI technologies may impact it. It is important to note that the healthcare AI systems being considered in this section are ones that influence clinical decision-making and are purely rational (i.e., do not account for affective reasoning), which I will refer to as 'diagnostic AI'. This includes screening patients to assess risk and severity, interpreting and assessing symptoms to aid in diagnosis, and developing treatment plans to aid in disease management – these account for most common applications of AI in medicine today [1].

One optimistic scenario, believed by some scholars, is that diagnostic AI technologies could be incorporated within clinical decision-making to the benefit of patient care, if done carefully enough [14], [25]. For example, Eric Schmidt, former chair of Alphabet, states that "if the promise of AI is fulfilled, we should be able to concentrate more fully on engaging with our patients and helping them navigate their health options for treatment" [19]. There is this idea that diagnostic AI provides technical support while physicians remain responsible for the "human-specific approach" [18]. In this section, I will show that this is not practically feasible.

A. Critiques of diagnostic AI replacing physicians

First, if we were to develop AI that could complete most of the medical tasks performed by physicians, the incentives for involving human providers would drastically decrease. The values embedded in AI systems are influences by companies and institutions, rather than patients [13]. Considering that many AI corporations claim to have cost-effective solutions and hospitals are continuously under pressure to cut costs, it is fair to assume that diagnostic AI would help reduce costs in the healthcare industry [2]. Thus, it would be economically disadvantageous to spend money on operating and maintaining diagnostic AI technologies while also hiring and paying human clinicians, even if the risks of rational clinical care are well known. This seems like the most likely scenario since, even today, physicians have had to increase the number of patients they see in a day to cover expenses due to their compensation decreasing [24]. At the very least, hospitals will no longer have doctors with the same skills and training we know of today. In the worst-case scenario, diagnostic AI would render physicians obsolete because hospitals would no longer see the need for keeping any healthcare providers. Ultimately, it seems that "techno-commercial motives are discordant with professional-relational foundation for care" [23]. If this were to happen, affects would no longer be considered in the clinical decision-making process and the field of healthcare would regress back to the paternalistic mode of care, one where "the computer knows best" [13].

Such a shift to purely rational healthcare would have several negative consequences. First, as outlined in section II, Patients require counselling, support, and discussion of treatment options after a diagnosis which are all deeply intertwined with their affects. Clinical decision-making incorporates the patient's perspective and the values attached to certain diseases [17]. Thus, as Jotterand and Bosco state, good clinical decision-making "cannot take the form of an algorithm since statistical methods, as the modus operandi of AI, cannot grasp the complexities of human cognition and behavior which include beliefs, motivations, intentions and desires" [17]. This is especially true for uncertain, risky, and emotionally fraught circumstances which require contextual and emotional intelligence [13]. For instance, at the same stage of a terminal disease, one patient might choose palliative care whereas another would opt for further therapy. If the only goal of the diagnostic AI system was to maximize lifespan, it would not result in a positive outcome for the first patient. There is no 'one size fits all' solution in clinical settings since "some decisions are not simply a matter of survival-based logic" – decisions should be made in the context of the patient's lived experiences [13].

Second, the integration may ironically lead to slower clinical decision-making since intuition and appraisal of patient's emotions often play a crucial role in guiding a physician's thinking [18]. According to one physician, "When you see a patient, when they walk through the door, you know what's wrong with them. Not because you've seen many like them and so on. By their appearance, by their behaviour, you know. You ask them two questions, and that's it. You understand. But artificial intelligence would have to go step by step, excluding similar things. So what might be straightforward for us, would require AI to ask 24 questions before arriving at the same conclusion we can get from two questions." [18].

Third, diagnostic AI would lead to the complete erosion of empathy, compassion, and the doctor-patient relationship which have been shown to improve clinical decision-making and patient outcomes (refer to section II). Many stakeholders are concerned about the loss of 'human touch' with the integration of AI because it cannot provide assistance that includes empathy or compassion, which is believed to be critical for safe and effective healthcare [18], [23]. For example, warm words and communication from physicians which convey a sense of trust and security are often crucial to patients [18]. This lack of consideration for the multi-dimensional and complex ideal of patient care would reduce healthcare down to the mere completion of medical tasks. However, higher efficiency or the increase in the number of patients treated does not equate to good patient care.

B. Critiques of diagnostic AI as a tool for physicians

Suppose that diagnostic AI was able to be used as a tool by physicians rather than replacing them.[2] In this scenario, the integration of AI in healthcare would further increase physician's workload. There is already a "care gap", or erosion of compassion, in the field of healthcare due to underpaid and overworked providers [23]. A study from 2017 found that the pressures faced by healthcare providers to meet austerity policy targets negatively impacted their ability to practice empathetic and holistic care [1]. At the same time, current requirements for healthcare AI development, such as the need for data to train models, has resulted in the datafication of healthcare, where doctors are spending more time on administrative tasks (e.g., entering data into a system) rather than communicating with their patient [18]. A hospital manager noted that physicians have "already become too focused on technology, neglecting personal contact with patients" [18]. As for future technologies, scholars state that the integration of diagnostic AI must be accompanied with an increased emphasis on AI literacy in medical education [11]. In this case, the doctor would have to learn how to interact with and evaluate AI systems while also having the time to provide empathetic and compassionate care [11]. If current implementation of technologies is hindering the patient-doctor relationship, how can we expect otherwise with the integration of future technologies? In a study, 10 primary care physicians were concerned that the integration of AI could lead to increased workload [25]. One physician states their concern that AI might actually make things harder on the physician, creating more work for them instead of less work just "like everything else that we have tried to do to make things better in medicine" [25]. It is paradoxical in a sense, since if the promise of increased efficiency through diagnostic AI results in physicians taking up additional tasks, where are they supposed to conjure up the time to engage with their patients? This increased workload can also lead to physician burnout and negatively impact the emotional well-being of physicians which, as I have previously outlined, can negatively impact patient outcomes [25].

The promise of increased efficiency with the integration of diagnostic AI is flawed for a couple more reasons. If physician and diagnostic AI were to collaborate alongside patients for shared clinical decision-making, there is still the risk of over-reliance on AI outputs. The AI's recommendations might influence doctors' decisions more than they realize, where its outputs "affect, shape, and even stand in tension with doctors' judgements" [13]. Since affective reasoning is integral to the clinical decision-making process, as outlined in section II, this could result in a more "transactional approach" to healthcare, where empathy, personalized care, and cultural understanding are diminished [14]. Some scholars fear that doctors would turn into "messengers of AI's outputs" [13]. This level of AI involvement would result in rational information exchange and task completion being the focus of the patient-doctor relationship which leads to patients engaging less openly in their care, potentially leading to worse health outcomes [14]. This transactional experience could also make patients feel dehumanized, "as if they are being reduced to mere statistical figures" [14]. Thus, the doctor-patient relationship would now feel impersonal and cold which would lead to the loss of the holistic approach to patient care.

Furthermore, an over-reliance on AI could raise questions about who is truly guiding the decision-making process, potentially leading to doubts about the physician's competency. Belief in the doctor's competency (alongside empathy and compassion) leads to patients being vulnerable with the physician, which is a fundamental characteristic of a trust relationship [1]. Thus, a patient's lack of belief that the human physician has the right skills and expertise required to help them can result in the erosion of trust in the patient-doctor relationship.

Now, there is still the issue that you cannot just separate the cognitive and emotional tasks of patient care – it is not possible for diagnostic AI to complete medical tasks while physicians provide the 'human touch'. As Hirmiz points out, deep care is precisely the combination of performing medical tasks and doing so while caring about the patient [2]. This is due to the significance of the attitude of care, defined as the "positive, affective bond and investment in another's wellbeing" [2]. A physician could provide the labour of care without the caring attitude but this would not be good care since "without the attitude of care, the open responsiveness to another that is so essential to understanding what another requires is not possible" [2]. In this hypothetical scenario, the clinician may not have the required skills to fully understand or address the needs and desires of the patient. Therefore, the labour and attitude of care must be performed by the same carer (i.e., human or AI) to provide patients with deep care.

IV. Implications for AI Development in Healthcare

As I've outlined above, affects are an integral part of healthcare and patient care cannot simply be separated into the rational AI and caring human, neither of which are accounted for in current development and integration of AI in healthcare. Thus, there is a need for alternative ways forward in the field of healthcare AI. In this section, I propose two potential solutions.

A. Developing emotion AI for Healthcare

One solution to the critiques I've raised in section III is to develop emotional AI for diagnostic purposes. In this scenario, AI would be able to both appraise the patients' emotions and express emotions, such as empathy and compassion, to the patient. The integration of affective computing techniques in healthcare AI would help improve clinical decision-making and essentially replace the core parts of a physician's role in patient care. This is not to say there would be no human involvement – there may still be other human caregivers such

[2]Note that this would require a complete overhaul of current economic incentives in healthcare AI development. It could be argued that, if this were to occur, one would be left with no incentives to develop diagnostic AI but that is outside the scope of this paper

as nurses or palliative care for end-of-life support - even though that is unlikely due to the economic incentives in the healthcare industry. But regardless, the use of emotionally intelligent AI for clinical decision-making would preserve the ideal of patient-centered care and SDM, allowing for value-plurality [1], [11]. Such value-plurality would allow patients' differing values, desires and priorities to be considered by AI for their care. In this scenario, patients would learn about their diagnosis in an empathetic and compassionate way that aligns with their preferences. Afterwards, the AI system and patient would essentially collaborate to come up with a treatment plan that makes the most sense for them. In fact, an emotional AI system would also give patients the choice to pursue further treatment or seek palliative care, strengthening the patient's autonomy [11].

This seems plausible since there has already been some research on the development of artificial empathy, where technologies are designed to sense and/or display empathy to their users [23]. Similarly, AI systems have been shown to mimic elements of human compassion somewhat successfully and used to enhance compassion within healthcare settings [23]. However, unlike empathy, to build truly artificial compassion, it would require more than just emotion recognition and expression. Artificial compassion would require researchers to intentionally design "adaptive responsiveness into technologies" [23]. Furthermore, OpenAI's GPT-4 seems to already be capable of identifying emotions in text and describing techniques for emotional management [26]. But there are again limitations, complex and irregular situations are hard for GPT-4 to analyze emotionally [26].

While the development of emotional AI would resolve the critiques mentioned above, it is still unclear whether such "optimization and operationalization of health care" would be a net positive [1]. If AI is able to provide holistic patient-care, it would most likely be available to patients as a self-diagnostic tool. This could be problematic because "patients have insufficient medical knowledge to independently understand their diagnoses or fully comprehend their own conditions" [18].

At the same time, it seems unlikely that truly emotionally intelligence healthcare AI will exist in the near future. Currently, applications of affective computing in medicine focus on a narrow set of specialties - specifically, mental health disorders (most commonly depression, alongside anxiety, bipolar disorder, etc.), autism recognition and intervention, and pain level recognition [27]. Furthermore, these systems tend to rely on simplistic models consisting of 3- or 6-class emotion classification models [27]. We also do not currently have the computational bandwidth to conduct "real-time emotional analysis and diagnosis" while maintaining accuracy [27]. Another factor to consider is that the understanding and expression of emotions can drastically change due to cultural, generational, and societal differences [23], [28]. Thus, in the context of healthcare, empathic or compassionate AI would be culturally- and time-bound and many different versions would have to be developed (which would be resource-intensive).

Some scholars go further to state that it is impossible to develop emotionally intelligent AI. Both Montemayor et al. and Hirmiz argue that AI is incapable of displaying or understanding empathy, and thus should never replace medical professionals [2], [29]. It has been argued that a patient simply believing that AI cares for them would not be satisfactory nor preferred by the patient [2]. This is supported by a study that demonstrated most patients would want to follow the advice of a human doctor rather than an AI machine, even when the AI used personalized conversational styles [11]. It seems that most stakeholders prefer "AI systems that support, rather than replace, the human aspects of patient care" [14], [17]. As one patient states, "humans can express emotions, empathy, help, and give hope for a better tomorrow better than any machine" [18].

B. Alternatively, developing AI for non-clinical tasks

This leads me to the second proposed solution, abandoning the development of AI for clinical decision-making altogether. Considering that the viability and existence of emotionally intelligence healthcare AI is still up for debate, it might make more sense to refocus efforts on developing AI for non-clinical, administrative tasks so that doctors could focus on building a therapeutic relationship with their patient. Take, for example, this account of one physician: "Honestly, all that typing, printing, and confirming of test results and such, I waste a lot of time on it, and the actual examination of the patient and talking to them, I believe, should be retained, but in a way that avoids the need for me to look at the screen constantly. Personally, when I gather data, sometimes I forget that, while I'm typing and looking at the screen, I'm not really looking at the patient themselves, and I end up missing information I could gather just by observing them" [18]. It has been found that administrative tasks such as manual data collection during consultations are one of the most time-consuming and erode the doctor-patient relationship [23]. In fact, a study from 2018 stated that UK's national health system could save "up to 10% of its running costs by outsourcing repetitive and administrative tasks to artificial intelligence technologies" [1]. Many healthcare stakeholders also hope that the integration of AI will address other non-clinical tasks such as decreasing waiting times and overcrowding, and improving access to healthcare services [18]. Such applications of AI may be able to address the "care gap" prevalent in healthcare today [23]. Thus, the promise of greater efficiency with the integration of AI in healthcare is possible, but only if the right tasks are automated. Therefore, researchers should focus on creating tools that help healthcare workers improve relationships with their patients, rather than drifting them further apart.

V. Conclusion

In this paper, I hope to have outlined that affects are crucial to the clinical decision-making process and thus crucial to consider when building healthcare AI systems. Diagnosis is not the be-all end-all of healthcare - empathy, compassion, and trust are an integral part of the patient-doctor relationship which helps improve clinical outcomes. The development of

a purely rational diagnostic AI would lead to the erosion of empathy and trust in clinical settings, resulting in a more transactional approach to healthcare that disregards the patient's emotional needs, values and desires. Therefore, I propose two potential solutions that account for the role of affects in clinical care. First, researchers could incorporate affective computing techniques to develop emotionally intelligent AI systems for clinical decision-making. However, the existence of truly emotionally intelligent AI seems unlikely in the near future and this may not be desirable for patients, or society, after all. Thus, alternatively, researchers should increase focus on developing AI for non-clinical, administrative tasks which would allow physicians to focus on fostering therapeutic relationships with patients.

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