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Calibrating trust in generative artificial intelligence for clinical communication through Chinese medical humanism

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Generative artificial intelligence is entering clinical communication through patient messaging, health education, and conversational decision support. Its capacity to produce reassuring language can coexist with inaccurate advice, unclear responsibility, and culturally inappropriate explanations. This mini-review examines how Chinese medical humanism can inform the calibration of trust in these encounters. Targeted literature identification integrates studies of trust and perceived empathy, research on traditional Chinese medicine communication, and medical education evidence with normative scholarship. The evidence distinguishes perceived empathy from relational accountability and technical performance from demonstrated patient benefit. Chinese medical ideals of benevolence, sincerity, holistic attention, and contextual judgment offer resources for interpreting professional responsibilities, but their incorporation into artificial intelligence has not been shown to restore trust or improve health outcomes. We synthesize these insights into a proposed dual-verification approach: an epistemic track checks evidence, uncertainty, and safety, while a relational track checks patient understanding, cultural meaning, preferences, and access to human care. Their convergence supports accountable communication and allows unresolved concerns to trigger human review. Educational applications connect critical appraisal of generated responses with reflection on classical medical ethics. Evaluation should prioritize appropriate reliance, error recognition, patient agency, and equitable access rather than maximizing trust scores. This approach reframes humanistic integration as a set of responsibilities for clinicians and institutions, with its effectiveness remaining an empirical question.

KEYWORDS
calibrated trust, generative artificial intelligence, health equity, medical education, medical humanism, physician-patient communication, traditional Chinese medicine

1 Introduction

Generative artificial intelligence (AI) is becoming an intermediary in clinical communication, producing explanations, drafting patient messages, and supporting health-related decisions. These functions can improve access to understandable information, but they also redistribute interpretive authority between patients, clinicians, and technology providers. Ethical analyses identify risks involving unreliable information, confidentiality, professional responsibility, and the therapeutic relationship (1, 2). When communication tools operate across community services and patient portals, these concerns extend to population-level health literacy, equitable access, and confidence in healthcare institutions (3).

The central problem is not necessarily insufficient trust. A convincing response may attract reliance that exceeds its evidential support, while disclosure of legitimate AI assistance may discourage patients from seeking care. A randomized US survey experiment found lower reported trust and help-seeking intentions when physician profiles described AI-assisted diagnosis (4). Conversely, experimental work suggests that AI-generated language can be rated highly for empathy (5). These findings concern different objects and settings of trust; they do not establish a universal crisis or justify concealing AI use.

Chinese medical humanism offers a culturally situated perspective on these tensions. Its concern for life, patient subjectivity, and relational responsibility has been articulated in contemporary interpretations of medical dao (6). This review examines its relevance to AI-mediated clinical communication, with particular attention to traditional Chinese medicine (TCM) settings. We distinguish evidence about communication from normative interpretation and propose practical criteria for calibrated trust: reliance proportionate to demonstrated capability, uncertainty, and accountability.

2 Review approach

This thematic narrative mini-review used targeted searches of PubMed-indexed records, Europe PMC, and selected publisher websites for literature available up to September 30, 2026. Searches focused on generative AI and large language models in relation to trust, empathy, and clinical communication; TCM in relation to communication and ethics; and AI-assisted communication training. Exact-title searches were also used to verify selected references. Priority was given to peer-reviewed empirical studies, relevant evidence syntheses, and normative analyses; World Health Organization guidance provided a governance reference. Purely technical studies were retained only when they clarified the gap between model capability and communication outcomes. The literature was organized around reliability, relational responsibility, cultural interpretation, and education. These domains served as an interpretive structure for comparing the relevance, main findings, and limitations of the selected sources in relation to the review question. Through reading and comparing the literature, the authors considered how empirical findings, ethical arguments, and cultural perspectives informed the central discussion. This was an author-led narrative synthesis rather than a formal qualitative coding exercise; no dedicated coding software or formal inter-coder reliability assessment was used. This was a selective synthesis, not an exhaustive systematic review; no pooled effect estimate or formal certainty grading was undertaken. Proposed pathways are interpretive extensions of the literature, not evaluated interventions.

3 Evidence on trust and its limits

3.1 Perceived empathy and relational responsibility

In a cross-sectional comparison of 195 online questions, healthcare professionals preferred chatbot responses in 78.6% of evaluations; chatbot replies were also substantially longer than physician replies (5). A subsequent systematic review identified 15 comparative studies, with pooled data from 13 favoring AI on perceived empathy. However, assessments were predominantly text-based, often used proxy raters, and relied heavily on unvalidated measures (7). These findings support the communicative potential of generated language, without establishing better longitudinal care or moral competence.

Source attribution also matters. Across nine studies involving 6,282 participants, Rubin et al. found that identical AI-generated responses were perceived as more empathic and supportive when attributed to humans (8). These were studies of emotional support, so transfer to clinical encounters requires caution. Kreitmairs philosophical analysis distinguishes empathic expression from reciprocal recognition and the responsibilities inherent in clinical relationships (9). Together, these perspectives suggest that appropriate language and accountable care require separate assessment. A system can acknowledge distress without presenting itself as a feeling clinician; a responsible professional must remain identifiable when advice requires clinical judgment.

3.2 Reliability and cultural plausibility

Algorithmic opacity, factual error, and accountability are related but distinct problems. A comprehensible explanation may still be incorrect, and a fluent rationale is not independent evidence that the underlying recommendation is sound. Ethical analyses emphasize oversight and source verification (1). Bias is likewise an empirical concern: an evaluation of four language models found examples of responses reproducing discredited race-based medical assumptions (10). Model-specific findings should not be generalized across all systems, but they justify subgroup-sensitive evaluation.

In TCM, an additional challenge concerns what counts as a faithful explanation. Scholarship on translation warns that terms such as qi and shen can lose their interpretive context when reduced to simple biomedical equivalents (11). Work on explainable TCM-AI similarly separates predictive performance from theoretical coherence and cultural integrity (12). Respect for cultural meaning, however, does not establish the efficacy of a

treatment. Generated advice should distinguish historical doctrine, practitioner interpretation, and contemporary clinical evidence. Otherwise, a culturally familiar account may increase confidence while leaving its safety or benefit unverified.

3.3 Acceptance and technical performance are indirect evidence

TCM-specific studies illustrate the distance between feasibility and trustworthy communication. Lingdan improved performance on selected knowledge and prescription-recommendation tasks using domain-specific training data (13). A comparative evaluation of five models included a collaboration assessment involving ten practitioners and five clinical cases; AI assistance improved rated decision quality and reduced completion time (14). Neither study demonstrated improved patient trust, informed choice, or clinical outcomes.

A survey of 2,587 health-seeking individuals across 13 Chinese institutions found that 61.7% were willing to try TCM-AI services, whereas 43.5% trusted their diagnostic results (15). The survey addressed broader TCM-AI equipment and services rather than generative communication specifically. Its cross-sectional design cannot establish that cultural identification causes trust or that willingness predicts safe use. These distinctions make clear why implementation should measure actual understanding and behavior alongside acceptance.

4 Reinterpreting Chinese medical humanism

4.1 Benevolence and sincerity as responsibilities

Contemporary scholarship on the ethical traditions of Chinese medicine interprets classical medical ethics, including the ideas associated with Sun Simiao, as emphasizing respect for human life and recognition of the patients' own experiences, perspectives, and preferences (6). Their relevance here is normative: benevolence directs attention to suffering and avoidable harm, while sincerity requires honest representation of competence and limitations. These commitments belong to clinicians, developers, and institutions. They should not be treated as psychological properties that can simply be installed in a language model.

An analysis of 395 online TCM consultations identified communication practices combining credibility, acknowledgment of limitations, patient-safety prioritization, and educational support (16). This provides examples of observable practice rather than causal evidence that ethical language improves adherence. For AI-assisted encounters, a contemporary interpretation would require disclosure of the tools role, correction of unsupported assertions, and a clear route to an accountable clinician. Benevolent presentation without these protections risks functioning as persuasion. The goal is to make care more responsive while preserving the patients ability to question advice.

4.2 Holistic attention and contextual judgment

Interactional research demonstrates how TCM practitioners and patients connect bodily concerns with everyday life. A Mandarin consultation study described the collaborative construction of holism (17), while research in Hong Kong identified questioning and linguistic strategies that establish common ground and elicit daily experiences (18). A systematic review of 25 studies situated TCM communication within relationship building, self-care, and sociocultural context (19). These findings support attention to the persons circumstances rather than an assumption that a particular medical tradition is intrinsically more empathic.

Indeed, a cross-sectional study of 514 patients found perceived empathy in Chinese medicine comparable to conventional-care findings, with ratings associated with consultation and waiting times (20). Holistic attention therefore requires organizational conditions, including adequate time and continuity. In AI-supported communication, it could mean asking about treatment goals, practical constraints, concurrent care, and preferred explanations, then allowing patients to correct the summary. Bianzheng, or pattern differentiation, can inform discussion of contextual judgment, but it should not be equated with algorithmic personalization or used to infer diagnostic validity from conversational fluency.

4.3 Cultural responsiveness without cultural essentialism

Chinese medical traditions are internally diverse, and patients vary in their attachment to them. Cultural responsiveness should be elicited rather than inferred from ethnicity, language, or treatment history. Patients should be able to request biomedical explanations, traditional interpretations, both, or neither. Translation scholarship and explainability research support attention to meaning, but do not justify substituting cultural plausibility for evidence (11, 12). Similarly, relational harmony should not suppress disagreement or override autonomous choice. Classical virtues offer a vocabulary for professional reflection alongside contemporary rights, privacy protections, and public health duties; they do not replace these safeguards or establish a cultural hierarchy.

5 A dual verification approach to accountable communication

The dual-verification approach was developed as an author-proposed conceptual synthesis of the evidence and normative arguments reviewed in this article, rather than as a pre-existing model identified in the literature or a theory generated through formal qualitative coding. Its epistemic component addresses factual reliability, uncertainty, bias, and the distinction between technical performance and demonstrated patient benefit, drawing on literature concerning AI ethics, clinical communication, and

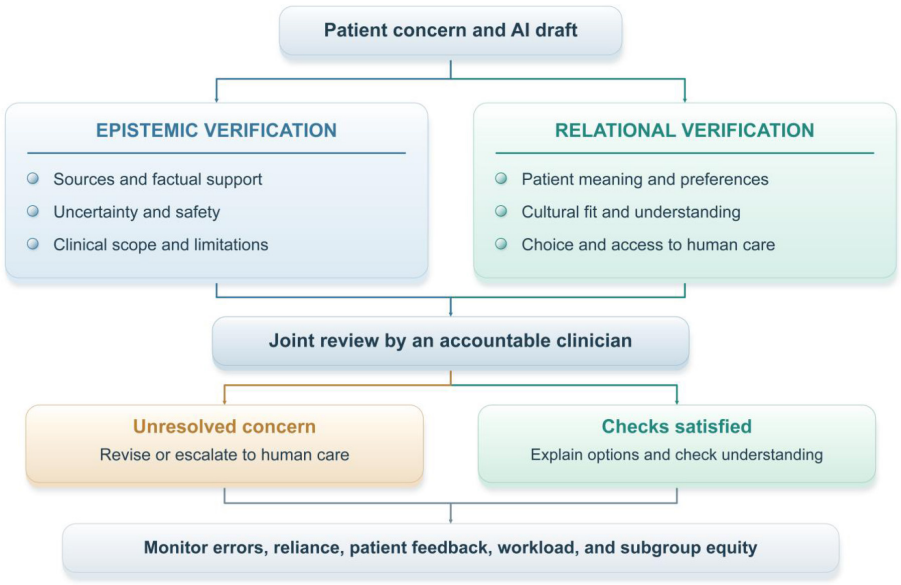


FIGURE 1
Proposed dual verification of AI-mediated clinical communication. The epistemic track examines evidential support and safety; the relational track examines patient meaning, cultural fit, understanding, and choice. A designated clinician integrates both tracks for higher-risk communication. Unresolved concerns trigger revision or escalation, while ongoing monitoring examines appropriate reliance and unequal effects. The arrows denote a proposed workflow, not established causal relationships. Urgent concerns follow clinical escalation pathways immediately. The approach is a conceptual synthesis and has not been prospectively validated. AI, artificial intelligence.

TABLE 1 Evidence boundaries and proposed responsibilities for calibrated trust.

Evidence domain	Humanistic interpretation	Proposed action and accountable actor	Candidate evaluation measures
Reliability and uncertainty (1, 13, 14)	Sincerity and professional competence	Clinician verifies sources, scope, and uncertainty; institution audits corrections.	Unsupported-claim rate; error recognition; unsafe advice escalation
Perceived empathy (5, 7–9)	Benevolence with accountable care	Clinician acknowledges distress; service discloses AI involvement and offers human contact.	Patient-reported respect; understanding of AI role; access to clinician
Cultural meaning (11, 12, 17, 18)	Holistic attention and contextual judgment	Patient and clinician confirm preferred vocabulary, goals, constraints, and unresolved concerns.	Patient-confirmed meaning; comprehension; inappropriate agreement
Access and unequal risk (3, 10, 15)	Equal regard and respect for choice	Institution audits subgroup performance and preserves non-AI access; collects only necessary data.	Subgroup error and comprehension gaps; human-review availability
Training and reliance (21–23)	Reflective practice and responsible judgment	Educators combine source checking, classical ethics reflection, and supervised simulation.	Observed communication; appropriate reliance; workload; adapted trust measures

The humanistic interpretations and actions are proposed by this review. The cited studies support the stated evidence domains, not the effectiveness of the combined intervention. Measures are candidates for validation; trust should be interpreted alongside observed reliance and safety. AI, artificial intelligence.

TCM-AI evaluation (1, 10, 12–15). Its relational component addresses the distinction between perceived empathy and accountable care, together with research on patient-centered TCM communication, cultural interpretation, and patient agency (8, 9, 11, 17–20). Medical humanism provides the normative perspective through which these concerns are interpreted, particularly in relation to benevolence, sincerity, holistic attention, and respect for individual preferences (6, 16–20). The two components were brought together because trustworthy clinical communication requires attention both to the evidential adequacy of advice and to patients understanding, circumstances, and access to accountable human care. This conceptual integration remains a reasoned proposal and has not been validated as a formal framework or demonstrated to improve clinical outcomes.

We propose two complementary verification tracks to translate these insights into practice (Figure 1). The epistemic track checks factual support, provenance, uncertainty, contraindications, and the boundary between general information and individualized advice. The relational track checks whether the patients concerns and preferences have been represented, whether cultural terms retain their intended meaning, and whether the person understands the limitations and available alternatives. The proposal synthesizes existing ethical and communication literature; its effectiveness has not been established. Table 1 links its components to evidence, accountable actors, and candidate outcomes.

5.1 Verification before reliance

An AI system may draft a response from approved sources and flag missing information, but it should not certify its own accuracy. For higher-risk communication, a designated clinician should independently review relevant evidence and document material corrections. Retrieval augmentation and knowledge graphs may improve traceability, yet their presence does not guarantee factual correctness or faithful explanations (12, 13). Historical statements should be labeled as such, and uncertainty should remain visible even when the response uses culturally familiar language.

Relational verification requires an opportunity for correction and disagreement. A clinician can ask the patient to restate the proposed next step, clarify concerns, and confirm whether the explanatory vocabulary is helpful. This is a contemporary operationalization of holistic attention and sincerity, not a claim that classical medicine anticipated modern data governance. Institutions must separately define access controls, permitted data uses, and retention arrangements in accordance with applicable requirements and health-AI governance principles (3). Patients should not be required to accept AI-mediated contact to obtain necessary care.

5.2 Escalation and institutional accountability

Both tracks must converge before higher-risk advice is acted on. Unsupported recommendations, conflicting evidence, patient misunderstanding, or unresolved preferences should trigger revision or human assessment. Urgent clinical concerns should follow established clinical escalation pathways rather than wait for an AI workflow to complete. Human oversight is meaningful only when reviewers have time, competence, authority, and access to the relevant information; nominal sign-off can simply relocate automation bias.

A hypothetical example is a patient asking whether a traditional formulation can replace an existing treatment. Epistemic verification would examine the claims evidence and safety implications. Relational verification would explore the patients reasons, prior experiences, and intended action without dismissing those beliefs. Any individualized change would remain a clinical decision. The example illustrates the proposed workflow and reports no patient data or intervention effect.

Institutions should record the model version, reviewer responsibility, corrections, and patient feedback where appropriate, and monitor subgroup differences in errors, comprehension, and access to human review. These safeguards connect a clinical encounter to public health: a service that appears successful on average may systematically disadvantage people with limited literacy, language barriers, or restricted digital access.

5.3 Education and evaluation

The educational application connects modern interpretations of classical medical ethics with observable communication behavior. Learners can compare an AI draft with its cited evidence, identify unsupported claims, explain uncertainty in plain language, and discuss how benevolence or sincerity would change their response to a patients disagreement. Reflection should be combined with supervised practice and feedback from patients or trained simulated patients.

Available educational evidence is encouraging but indirect. In a randomized study of 82 medical students, AI virtual standardized patients improved SEGUE total and content scores relative to traditional standardized patients, while process scores were similar (21). A separate cluster randomized trial involving 85 nursing students reported improvements in self-reported professionalism, empathy, and humanistic care after narrative medicine training (22). Neither tested a curriculum combining Chinese medical ethics with generative AI, and improved educational scores do not establish better patient outcomes. Their contribution is to justify testing a combined curriculum, not to demonstrate its efficacy.

Evaluation should distinguish felt trust from warranted reliance. The Trust in AI-Generated Health Advice scale and its short form assess state trust and distrust, with psychometric validation in a UK symptom-assessment sample (23). Adaptation to Chinese-language TCM encounters requires cultural and measurement validation. Trust scores should be paired with recognition of erroneous advice, understanding of uncertainty, appropriate help-seeking, perceived respect, reviewer workload, and subgroup disparities. Trials could compare verified AI communication with and without culturally responsive relational review, alongside usual communication, while holding source quality and clinical oversight constant. Success would mean better discrimination between reliable and unreliable advice rather than indiscriminately greater acceptance.

6 Discussion and conclusion

The reviewed literature supports three distinctions: empathic wording differs from relational accountability; technical performance differs from patient benefit; and cultural familiarity differs from evidential validity. Chinese medical humanism contributes an interpretive account of professional responsibility and attention to lived context. Its practical value is most defensible when expressed through reviewable actions, such as acknowledging uncertainty, inviting disagreement, and ensuring human access. These actions overlap with patient-centered care across traditions; their contribution is contextual articulation rather than cultural exclusivity. This perspective is also consistent with broader efforts to integrate medical humanities into digital public health, where responsible AI implementation requires more than technical performance or abstract ethical principles; it calls for coordinated attention to human-centered AI design, medical education, and multi-stakeholder governance (24).

The evidence remains heterogeneous. Trust experiments often use hypothetical encounters, empathy studies frequently evaluate isolated text, TCM communication research is largely observational, and educational outcomes are commonly short-term or self-reported. This selective review cannot establish the prevalence of harms or the superiority of the proposed

approach. It also cannot determine whether culturally responsive communication reduces inequities, increases inappropriate reliance, or imposes unsustainable review burdens. Model updates and differences between health systems further limit transferability.

Future studies should test the dual-verification approach prospectively, examine patient-defined outcomes, and evaluate both under-reliance and over-reliance after errors or disagreements. Cultural interpretation should be co-designed with diverse patients rather than imposed as a fixed identity. For digital public health, the objective is an accountable communication service that people can question, understand, and use safely. Classical medical humanism may help articulate this objective, but improved trustworthiness and health outcomes require empirical demonstration.

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JH: Writing – original draft. SC: Writing – original draft. ML: Conceptualization, Writing – original draft. JS: Writing – original draft, Conceptualization. XP: Writing – review & editing. ZP: Writing – review & editing.

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Conflict of interest

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Generative AI statement

The author(s) declared that Generative AI was not used in the creation of this manuscript.

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