

《医学专业教师 AI 素养（CAIP-ME）能力清单及测评共识（2025）》

定稿工作会会议纪要

一、会议基本信息

会议名称	《医学专业教师 AI 素养（CAIP-ME）能力清单及测评共识（2025）》定稿工作会
会议时间	2025 年 12 月 28 日 12:00-16:00
会议地点与形式	中国医学科学院北京协和医学院主会场；部分专家线上参会
会议性质	两轮德尔菲专家咨询后的专家共识审议与定稿会议
会议主题	审议 CAIP-ME 能力清单及测评共识定稿稿，重点讨论两轮德尔菲后仍存在分歧的条目，并确认其最终基础能力或发展能力定位
主要成果	原则通过送审稿；确认由 11 项基础能力、14 项发展能力构成的两层框架；要求执笔组据专家意见完成最后修订、发表推进与后续实施安排

二、会议背景与目的

本次定稿工作会是在文献检索、能力条目初拟、专家预咨询及两轮德尔菲咨询基础上召开的专家审议会议。会议重点是对两轮德尔菲咨询后仍存在分歧或处于边界状态的能力条目进行集中讨论、解释和再次确认，并据此明确其基础能力或发展能力定位。

会议同时审议了共识框架的适用对象、医学教育场景中的伦理与安全底线、实施路径、成果发表形式及后续推广安排，为共识文本定稿和中英文成果传播提供程序性依据。

三、参会情况

会议邀请医学教育、临床医学、公共卫生、医学信息学、教育技术、管理评价、伦理治理等领域专家参加，并包括院士顾问、主管部门代表、院校管理者、临床带教专家以及 AI 和教育技术相关专家。参会专家名单见附件。

四、主要审议事项

（一）德尔菲咨询结果与框架定位

会议听取并审议了两轮德尔菲咨询结果。专家认为，CAIP-ME 五维框架能够覆盖医学教师在 AI 时代所需的价值认知、伦理安全、技术理解、教学融合、学习评价、专业发展和生态共建等关键方面，具有医学教育情境下的现实针对性和推广价值。会议同意保留五维、25 项能力的总体框架。

（二）基础能力与发展能力的分类裁决

会议重点审议第二轮德尔菲咨询中基础能力与发展能力归类仍有分歧的条目。会议确认，第二轮投票结果用于识别专家意见集中程度和分歧条目，在充分讨论后综合能力性质、医学教师普遍必要性、伦理与安全底线、培训可达性、教学场景适用性以及创新发展属性进行裁决。专家会议讨论后认为不再逐项改写或重新投票，最终按第二轮投票的相对多数方向确定。

经讨论和再次确认，会议最终形成 11 项基础能力、14 项发展能力的两层框架。基础能力定位为医学教师在 AI 时代开展安全、合规、有效教学应普遍具备的底线性能力；发展能力定位为教师可结合学科特点、课程场景、职业发展和机构支持条件进一步深化的高阶能力。

最终基础能力为：CAIP-ME1 医学教育 AI 赋能价值认知；CAIP-ME2 医学 AI 伦理风险识别与评估；CAIP-ME3 学术诚信与 AI 使用规范指导；CAIP-ME4 促进教育公平与正义的实践能力；CAIP-ME5 AI 核心概念与医学应用理解；CAIP-ME7 数据安全和隐私保护操作；CAIP-ME8 AI 辅助文献检索与分析；CAIP-ME15 AI 支持的形成性评价设计；CAIP-ME16 学习分析解读与教学干预；CAIP-ME17 数字素养诊断与支持；CAIP-ME19 AI 教学实践反思与优化。

最终发展能力为：CAIP-ME6 医学 AI 工具评估与选型；CAIP-ME9 基础科研数据处理与可视化；CAIP-ME10 AI 增强教学设计；CAIP-ME11 智能虚拟仿真教学应用；CAIP-ME12 AI 辅助教学资源创作；CAIP-ME13 人机协同课堂组织；CAIP-ME14 临床情境 AI 工具教学衔接；CAIP-ME18 学生 AI 素养发展跟踪与评价；CAIP-ME20 跨学科协作与沟通；CAIP-ME21 AI 教学改革研究与成果转化；CAIP-ME22 终身学习与前沿追踪；CAIP-ME23 同伴分享与共同体建设参与；CAIP-ME24 机构层面 AI 教学文化推动；CAIP-ME25 AI 教育生态宏观理解。

对第二轮处于 40%-60% 区间或接近边界的条目，会议作出如下裁决：CAIP-ME4（基础 52%、发展 48%）定为基础能力；CAIP-ME6（基础 48%、发展 52%）定为发展能力；CAIP-ME8（基础 53%、发展 47%）定为基础能力；CAIP-ME15（基础 55%、发展 45%）定为基础能力；CAIP-ME16（基础 57%、发展 43%）定为基础能力；CAIP-ME17（基础 59%、发展 41%）定为基础能力；CAIP-ME20（基础 45%、发展 55%）定为发展能力；CAIP-ME22（基础 48%、发展 52%）定为发展能力。

（三）适用对象与称谓

会议讨论了“医学专业教师”和“医学教师”等称谓及适用对象边界。专家建议在发表稿中统一术语表达，并明确框架适用于医学高校、附属医院和教学医院等场景中的医学教师、临床带教医师、专兼职教师、教师发展管理者及相关教育管理人员。

（四）医学特色、伦理边界与教师责任

会议强调，医学教师 AI 素养建设必须体现医学教育的专业属性和人文温度。共识文本应强化学术诚信、数据安全、隐私保护、算法偏倚、AI 幻觉、责任边界和教师批判性判断等内容，明确 AI 应服务于医学教育质量提升和学生发展，不得替代教师的伦理判断、临床责任和育人责任。

（五）实施路径与推广方式

会议建议采取分层推进、试点先行和动态迭代的实施思路。基础能力可作为教师发展培训、入职培训和常规能力建设的重要内容；发展能力宜通过示范课程、案例库、虚拟教研室、平台资源、跨学科项目、教学改革课题和激励机制加以支持。会议还建议建立年度修订机制，根据 AI 技术发展、医学教育政策变化、实践验证结果和国际标准演进持续完善框架。

（六）稿件形态与成果传播

会议建议正式发表稿应突出核心框架、德尔菲方法、主要结果和实施建议，表达上适度精简；详版材料、案例库、测评工具和实施指南可作为附件、单行本或后续推广材料保存。会议同时认为，应重视共识成果的国际传播，建议在符合学术出版伦理和二次发表规范的前提下推动英文版发表。

五、会议决议

- 原则通过《医学专业教师 AI 素养（CAIP-ME）能力清单及测评共识（2025）》送审稿。
- 授权执笔组依据会议意见完成最后修订，包括精简表述、统一称谓、说明适用对象、明确基础能力与发展能力分类逻辑、补充术语解释与实施路径，并修正文字、术语和场景不一致问题。
- 确认两轮德尔菲后仍存在分歧的能力条目，须经定稿工作会讨论和再次确认后纳入最终分类；会议最终确认 11 项基础能力和 14 项发展能力的两层框架。
- 同意修订后按程序推进中文版专家共识正式发表，并继续开展实证研究、试点推广、案例库建设、课程与平台建设以及年度迭代。
- 同意重视共识成果的国际传播；所有共识专家（含作者）均同意并授权在符合出版伦理要求的前提下发表英文版专家共识。英文版投稿和发表应如实说明中文首发来源，取得原中文期刊授权，并遵守目标英文期刊关于二次发表、改编和透明披露的要求。

附件：参会专家名单

姓名	单位/职务
张立群	中国工程院院士
侯凡凡	中国科学院院士
黄荷凤	中国科学院院士
徐兵河	中国工程院院士

蒋建东	中国工程院院士
范先群	中国工程院院士
庾石山	中国工程院院士
程 涛	中国工程院院士
朱 兰	中国科学院院士
夏韶华	教育部高等教育司农林医药处处长
李振宁	国家卫生健康委科技教育司教育处副处长
弓孟春	广东医科大学多模态数据融合创新实验室主任
马睿婷	内蒙古自治区精神卫生中心（脑科医院）GCP 机构办公室主任
王 瑾	广东医科大学高等教育研究与教师发展中心主任
卢景辉	广东医科大学党委书记
刘 莉	南方医科大学南方医院健康管理中心主任
孙佳月	东北大学信息科学与工程学院教授
佟 矿	广东医科大学副校长
张 闯	北京邮电大学教授、北京物资学院副院长
张 博	华中科技大学第二临床学院（同济医院）教学办公室主任
张文生	中国科学院自动化研究所研究员
李 勤	北京理工大学医学技术学院副院长
李海潮	首都医科大学附属北京朝阳医院院长
杨亚桥	重庆医科大学附属第一医院大数据与智慧医疗研究中心副主任
辛贵忠	中国药科大学学生药学系主任
罗 力	复旦大学公卫学院党委书记
陈 卉	首都医科大学生物医学工程学院智能医学工程系主任
陈 崑	中山大学附属第一医院副院长
侯明星	内蒙古医科大学附属医院副院长
段家宇	郑州大学附属第一医院肾内科副研究员
赵 钢	西北大学医学部主任
赵玉虹	中国医科大学附属盛京医院教授
骆斯慧	中国科学技术大学附属第一医院内分泌科教授
徐 波	重庆大学智能肿瘤学实验室主任

曹 江	徐州医科大学第一临床医学院副院长
吉训明	中国工程院院士，中国医学科学院北京协和医学院院校长
潘 慧	中国医学科学院北京协和医学院副院长
刘 辉	中国医学科学院北京协和医院医学信息研究所所长
王 婧	中国医学科学院北京协和医学院教务处处长
王 卫	中国医学科学院北京协和医学院教师发展中心主任
龙 笑	中国医学科学院北京协和医院整形美容外科主任
马 飞	中国医学科学院肿瘤医院肿瘤内科主任
陈 适	中国医学科学院北京协和医院内分泌科教授
李 超	中国医学科学院北京协和医院肾内科副教授
张大明	中国医学科学院北京协和医院放射科副教授
范思远	中国医学科学院北京协和医院神经内科副教授
夏 鹏	中国医学科学院北京协和医院肾内科副教授
黄久佐	中国医学科学院北京协和医院整形美容外科副教授
徐薇薇	中国医学科学院北京协和医学院教务处副处长
孙汶雯	中国医学科学院北京协和医学院教务处副处长
罗 妍	中国医学科学院医学信息研究所副研究员
魏旗鹏	中国医学科学院北京协和医学院信息化办公室干部
曾 乐	中国医学科学院北京协和医学院教务处干部
张博涵	广东医科大学多模态数据融合实验室研究员

Expert Consensus on the Competency List and Assessment Framework for Medical Educators' AI Proficiency (CAIP-ME, 2025 Edition)

Minutes of the Finalization Working Meeting

I. Basic Meeting Information

Meeting Title	Finalization Working Meeting for the Expert Consensus on the Competency List and Assessment Framework for Medical Educators' AI Proficiency (CAIP-ME, 2025 Edition)
Meeting Time	December 28, 2025, 12:00-16:00
Meeting Venue and Format	Main venue at the Chinese Academy of Medical Sciences and Peking Union Medical College; some experts attended online
Nature of Meeting	Expert consensus review and finalization meeting after two rounds of Delphi expert consultation
Meeting Theme	To review the final draft of the CAIP-ME competency list and assessment consensus, with a focus on discussing items that still showed disagreement after two rounds of Delphi consultation and confirming their final positioning as foundational competencies or developmental competencies
Main Outcomes	The submitted draft was approved in principle; a two-tier framework consisting of 11 foundational competencies and 14 developmental competencies was confirmed; the drafting group was required to complete final revisions, publication advancement, and subsequent implementation arrangements according to expert opinions

II. Meeting Background and Purpose

This finalization working meeting was an expert review meeting convened on the basis of literature retrieval, preliminary drafting of competency items, expert pre-consultation, and two rounds of Delphi consultation. The meeting focused on the centralized discussion, explanation, and reconfirmation of competency items that still showed disagreement or remained in a borderline state after the two rounds of Delphi consultation, and on this basis clarified their positioning as foundational competencies or developmental competencies.

The meeting also reviewed the applicable subjects of the consensus framework, ethical and safety baselines in medical education scenarios, implementation pathways, forms of outcome publication, and subsequent dissemination arrangements, thereby providing a procedural basis for finalizing the consensus text and disseminating the outcomes in Chinese and English.

III. Participation

The meeting invited experts from the fields of medical education, clinical medicine, public health, medical informatics, educational technology, management and evaluation, ethics and governance, and also included academician advisors, representatives of competent authorities, institutional administrators, clinical teaching experts, and experts related to AI and educational technology. The list of participating experts is provided in the Appendix.

IV. Main Matters Reviewed

(I) Delphi Consultation Results and Framework Positioning

The meeting heard and reviewed the results of the two rounds of Delphi consultation. Experts considered that the five-dimensional CAIP-ME framework could cover key aspects required by medical educators in the AI era, including value cognition, ethics and safety, technical understanding, teaching integration, learning assessment, professional development, and ecosystem co-construction, and that it had practical relevance and dissemination value in medical education contexts. The meeting agreed to retain the overall framework of five dimensions and 25 competencies.

(II) Classification Adjudication of Foundational Competencies and Developmental Competencies

The meeting confirmed that the Round 2 voting distributions were used to identify residual classification uncertainty and to provide the quantitative basis for workshop confirmation. For the 8 items that did not reach the predefined 60% classification threshold but showed a relative majority direction, the experts agreed that no further item-level wording changes or separate re-voting were needed. The final classification of these items was therefore determined according to the relative majority observed in Round 2 and confirmed by the workshop. Meeting minutes and the final classification list were circulated after the workshop, and no objections or additional revision requests were received.

After discussion and reconfirmation, the meeting ultimately formed a two-tier framework consisting of 11 foundational competencies and 14 developmental competencies. Foundational competencies were positioned as baseline competencies that medical educators should generally possess to carry out safe, compliant, and effective teaching in the AI era; developmental competencies were positioned as higher-level competencies that educators may further deepen in light of disciplinary characteristics, course scenarios, career development, and institutional support conditions.

The final foundational competencies are: CAIP-ME1 AI Empowerment Value Recognition in Medical Education; CAIP-ME2 Medical AI Ethical Risk Identification and Assessment; CAIP-ME3 Academic Integrity and AI Usage Norm Guidance; CAIP-ME4 Practice Ability to Promote Educational Equity and Justice; CAIP-ME5 Understanding Core Concepts and Medical Applications of AI; CAIP-ME7 Data Security and Privacy Protection Operations; CAIP-ME8 AI-Assisted Literature Retrieval and Analysis; CAIP-ME15 AI-Supported Formative Assessment Design; CAIP-ME16 Learning Analytics Interpretation and Instructional Intervention; CAIP-

ME17 Digital Literacy Diagnosis and Support; CAIP-ME19 Reflection and Optimization of AI Teaching Practices.

The final developmental competencies are: CAIP-ME6 Evaluation and Selection of Medical AI Tools; CAIP-ME9 Basic Research Data Processing and Visualization; CAIP-ME10 AI-Enhanced Teaching Design; CAIP-ME11 Intelligent Virtual Simulation Teaching Application; CAIP-ME12 AI-Assisted Teaching Resource Creation; CAIP-ME13 Human-AI Collaborative Classroom Organization; CAIP-ME14 Clinical Scenario AI Tool Teaching Connection; CAIP-ME18 Student AI Literacy Development Tracking and Evaluation; CAIP-ME20 Cross-disciplinary Collaboration and Communication; CAIP-ME21 Research and Translation of AI Teaching Reform; CAIP-ME22 Lifelong Learning and Frontier Tracking; CAIP-ME23 Participation in Peer Sharing and Community Building; CAIP-ME24 Promotion of AI Teaching Culture at the Institutional Level; CAIP-ME25 Macroscopic Understanding of the AI Education Ecosystem.

For items in the second round that were within the 40%-60% range or close to the boundary, the meeting made the following adjudications: CAIP-ME4 was designated as a foundational competency; CAIP-ME6 was designated as a developmental competency; CAIP-8 was designated as a foundational competency; CAIP-ME15 was designated as a foundational competency; CAIP-ME16 was designated as a foundational competency; CAIP-ME17 was designated as a foundational competency; CAIP-ME20 was designated as a developmental competency; CAIP-ME22 was designated as a developmental competency.

(III) Applicable Subjects and Terminology

The meeting discussed terms such as "teachers of medical specialties" and "medical educators" and the boundaries of applicable subjects. Experts recommended unifying terminology in the published manuscript and clarifying that the framework applies to medical educators, clinical teaching physicians, full-time and part-time teachers, faculty development administrators, and related educational administrators in scenarios such as medical colleges and universities, affiliated hospitals, and teaching hospitals.

(IV) Medical Characteristics, Ethical Boundaries, and Educator Responsibilities

The meeting emphasized that the development of AI proficiency among medical educators must reflect the professional attributes and humanistic warmth of medical education. The consensus text should strengthen academic integrity, data security, privacy protection, algorithmic bias, AI hallucinations, responsibility boundaries, and teachers' critical judgment, and make clear that AI should serve the improvement of medical education quality and student development, and must not replace teachers' ethical judgment, clinical responsibility, and educational responsibility.

(V) Implementation Pathways and Dissemination Methods

The meeting recommended adopting an implementation approach of layered advancement, pilot-first implementation, and dynamic iteration. Foundational competencies may serve as important content for faculty development training, onboarding training, and routine competency

development; developmental competencies should be supported through demonstration courses, case libraries, virtual teaching and research offices, platform resources, cross-disciplinary projects, teaching reform projects, and incentive mechanisms. The meeting also recommended establishing an annual revision mechanism to continuously improve the framework in accordance with developments in AI technology, changes in medical education policy, practice validation results, and the evolution of international standards.

(VI) Manuscript Form and Dissemination of Outcomes

The meeting recommended that the formally published manuscript should highlight the core framework, Delphi method, main results, and implementation recommendations, with appropriately concise expression; detailed materials, case libraries, assessment tools, and implementation guides may be preserved as appendices, standalone publications, or subsequent dissemination materials. The meeting also considered that attention should be paid to the international dissemination of the consensus outcomes, and recommended promoting publication of the English version on the premise of complying with academic publication ethics and secondary publication standards.

V. Meeting Resolutions

- The submitted draft of the Expert Consensus on the Competency List and Assessment Framework for Medical Educators' AI Proficiency (CAIP-ME, 2025 Edition) was approved in principle.
- The drafting group was authorized to complete final revisions in accordance with the meeting's opinions, including streamlining wording, unifying terminology, explaining applicable subjects, clarifying the classification logic for foundational and developmental competencies, supplementing explanations of terms and implementation pathways, and correcting inconsistencies in wording, terminology, and scenarios.
- It was confirmed that competency items for which disagreement persisted after the two Delphi rounds must be included in the final classification only after discussion and reconfirmation at the finalization working meeting; the meeting ultimately confirmed a two-tier framework comprising 11 foundational and 14 developmental competencies.
- It was agreed that, after revision, the formal publication of the Chinese expert consensus should proceed in accordance with procedures, and that empirical research, pilot dissemination, case library construction, course and platform construction, and annual iteration should continue.
- It was agreed that attention should be paid to the international dissemination of the consensus outcomes; all consensus experts, including the authors, agreed to and authorized the publication of the English version of the expert consensus on the condition that publication ethics requirements are met. Submission and publication of the English version should truthfully state the source of first publication in Chinese, obtain authorization from the original Chinese journal, and comply with the target English-language journal's requirements regarding secondary publication, adaptation, and transparent disclosure.

Appendix: List of Participating Experts

Name	Affiliation/Position
Zhang Liqun	Academician, Chinese Academy of Engineering
Hou Fanfan	Academician, Chinese Academy of Sciences
Huang Hefeng	Academician, Chinese Academy of Sciences
Xu Binghe	Academician, Chinese Academy of Engineering
Jiang Jiandong	Academician, Chinese Academy of Engineering
Fan Xianqun	Academician, Chinese Academy of Engineering
Yu Shishan	Academician, Chinese Academy of Engineering
Cheng Tao	Academician, Chinese Academy of Engineering
Zhu Lan	Academician, Chinese Academy of Sciences
Xia Shaohua	Director, Division of Agriculture, Forestry and Medical Education, Department of Higher Education, Ministry of Education
Li Zhenning	Deputy Director, Division of Education, Department of Science, Technology and Education, National Health Commission
Gong Mengchun	Director, Multimodal Data Fusion Innovation Laboratory, Guangdong Medical University
Ma Ruiting	Director, GCP Office, Inner Mongolia Mental Health Center (Brain Hospital)
Wang Jin	Director, Center for Higher Education Research and Faculty Development, Guangdong Medical University
Lu Jinghui	Party Secretary, Guangdong Medical University
Liu Li	Director, Health Management Center, Nanfang Hospital, Southern Medical University
Sun Jiayue	Professor, College of Information Science and Engineering, Northeastern University
Tong Kuang	Vice President, Guangdong Medical University
Zhang Chuang	Professor, Beijing University of Posts and Telecommunications; Vice President, Beijing Wuzi University

Zhang Bo	Director, Teaching Office, Second Clinical School (Tongji Hospital), Huazhong University of Science and Technology
Zhang Wensheng	Researcher, Institute of Automation, Chinese Academy of Sciences
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Li Haichao	President, Beijing Chaoyang Hospital, Capital Medical University
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