(06)

人工智慧應用與精準營養應用於整合醫學照護及醫學教育

The Application of Artificial Intelligence and Precision Nutrition in Integrated Medical Care and Medical Education

時　　間：114 年 6 月 28 日(星期六) 08:25~12:05
地　　點：臺北榮民總醫院 致德樓第六、七會議室

08:25-8:30	***Opening Remarks***	蘇建維主任 Chien-Wei Su
	Topics: 人工智慧應用於整合醫學照護及醫學教育	
	座長：高治圻 主任 (Chih-Chin Kao)	
08:30-08:55	AI 輔助臨床重點式超音波教學 AI-Assisted point of care ultrasound training for medical students	曾致學醫師 Chih-Hsueh Tseng
	座長：謝祖怡 主任 (Tsu-Yi Hsieh)	
08:55-09:20	資訊科技於創新臨床教育之應用：利用互動式電子病人評估表單提高見習醫學生的系統性評估技能 Application of information technology in innovative clinical education: Enhancing systematic assessment skills of medical clerks through interactive and visualized electronic patient evaluation forms	李佳儒醫師 Chia-Ju Li
	座長：張景智 主任 (Ching-Chih Chang)	
09:20-09:50	生成式 AI 在全人照護與醫學教育的應用 The Application of generative AI in holistic care and medical education: Clinical integration and transformative strategies from a southern Taiwan medical center	廖家德主任 Chia-Te Liao
09:50-10:00	Panel discussion	All speakers and moderators
10:00-10:30	***Coffee Break***	
	Topics: 精準營養與個人化健康：跨學科合作與發展趨勢	
	座長：周千瀅 主任 (Chian-Ying Chou)	
10:30-10:55	藥師於靜脈營養小組之角色-以某醫學中心跨團隊應用資訊科技周全建構新生兒配製型靜脈營養照護流程為例 The Roles of Pharmacists in Parenteral Nutrition Therapy Team: An example of constructing a comprehensive procedure for neonatal compounding parenteral nutrition care with multidisciplinary teamwork and information technology at a medical center	李珮甄藥師 Pei-Chen Lee

座長：姜至剛 署長 (Chih-Kang Chiang)

10:55-11:20	營養與醫學的和弦：實證臨床營養學在醫學教育的發展趨勢 The Interplay of Nutrition and Medicine: Development Trends of Evidence-Based Clinical Nutrition in Medical Education	劉馨惠醫師 Shin-Huei Liu

座長：蔡昕霖 教授 (Hsin-Lin Tsai)

11:20-11:50	營養品產業從研發、法規到市場與其社會責任 The nutraceutical industry from R&D , regulation to marketing and its social responsibility	邱建智總經理 Chien-Chih Chiu
11:50-12:00	Panel discussion	All speakers and moderators
12:00-12:05	***Closing Remarks***	侯明志副院長 Ming-Chih Hou

AI-Assisted point of care ultrasound training for medical students

AI 輔助臨床重點式超音波教學

Chih-Hsueh Tseng[a,b,c], Chia-Ju Li[a,b], Yen-Po Tsao[a], Ching-Hao Hsu[a,b], Ching-Chih Chang[a,b]
曾致學[a,b,c], 李佳儒[a,b], 曹彥博[a], 徐靖浩[a,b], 張景智[a,b]

[a]*Division of Holistic and Multidisciplinary Medicine, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC*

[b]*Department of Internal Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, ROC*

[c]*Institute of Emergency and Critical Care Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, ROC*

臺北榮民總醫院 內科部 全人整合醫學科

國立陽明交通大學 醫學院 急重症醫學研究所 及 內科學科

Background: With ultrasound devices becoming more affordable, point-of-care ultrasound (POCUS) is increasingly vital in clinical care. Despite its diagnostic accuracy and low cost, medical education lacks sufficient POCUS training due to limited instructors and access. ChatGPT-4o, with its real-time capabilities and medical knowledge, offers a promising solution. This project explores whether AI-assisted POCUS training using ChatGPT-4o can match or surpass traditional teaching methods in effectiveness and accessibility.

Methods: This study recruited clerkship medical students and post-graduate year (PGY) residents rotating through the Division of Holistic Integrated Medicine at Taipei Veterans General Hospital. Participants were invited to join the study following their introductory briefing on the first day of clinical rotation. Sample size estimation using G*Power (v3.1.9.7) for a paired Wilcoxon signed-rank test (effect size 1.92, $\alpha = 0.05$, power = 80%) indicated a minimum of 5 participants. A one-year recruitment period was planned, targeting 24–48 clerks and 12 PGY residents. Participants were randomized 1:1 into an AI-assisted or traditional teaching group. The intervention involved a structured POCUS teaching module focused on the FAST (Focused Assessment with Sonography for Trauma) exam. A pre-trained ChatGPT-4o model was used in the AI group, incorporating literature-based training (Gleeson & Blehar, 2018) and validated through expert testing to ensure ≥90% response accuracy. The teaching protocol consisted of: (1) a pre-test and a 15-minute FAST reading session; (2) a 10-minute theoretical session via ChatGPT-4o (AI group) or instructor-led teaching (traditional group); (3) a 15-minute hands-on FAST exam on standardized patients with real-time guidance via ChatGPT-4o or instructor; (4) a practical skills assessment, post-test, and feedback survey; and (5) crossover teaching for the AI group to receive traditional instruction. Learning outcomes included pre- and post-test knowledge scores, hands-on performance scores (probe position and image quality), and satisfaction surveys. Cost-effectiveness was evaluated by comparing learning outcomes, satisfaction, and teaching time between the groups.

Conclusion: This study will determine whether AI-assisted teaching using ChatGPT-4o is non-inferior or superior to traditional instructor-led methods in POCUS education for medical students and residents.

Application of information technology in innovative clinical education: Enhancing systematic assessment skills of medical clerks through interactive and visualized electronic patient evaluation forms

資訊科技於創新臨床教育之應用：利用互動式電子病人評估表單提高見習醫學生的系統性評估技能

Chia-Ju Li[a,b], Yen-Po Tsao[a], Chih-Hsueh Tseng[a,b], Ching-Hao Hsu[a,b], Ching-Chih Chang[a,b]
李佳儒[a,b] 曹彥博[a] 曾致學[a,b] 徐靖浩[a,b] 張景智[a,b]

[a]*Division of Holistic and Multidisciplinary Medicine, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC*

[b]*Faculty of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, ROC*

臺北榮民總醫院 內科部 全人整合醫學科

國立陽明交通大學 內科學科

Background: Medical clerks face challenges in clinical internships, particularly in organizing complex patient information. These difficulties are prominent in holistic internal medicine, where clerks manage elderly patients with multiple comorbidities. Traditional training may not fully support systematic assessment and clinical reasoning. The COVID-19 pandemic accelerated digital learning adoption, demonstrating its potential to enhance clinical skill acquisition. This study explores how interactive, technology-enhanced learning approaches can improve clerks' learning outcomes.

Methods: Enrolled participants were medical clerks undertaking a two-week rotation in the Department of Holistic and Multidisciplinary Medicine. An interactive, visualized electronic patient evaluation tool was developed and integrated into the clerkship curriculum. It includes structured patient assessment forms, a self-assessment module, real-time faculty feedback, and a Mini-Clinical Evaluation Exercise (Mini-CEX) component. Clerks used the tool during patient work-ups and case presentations, while faculty provided feedback through the platform. A mixed-methods approach evaluated its effectiveness by comparing Mini-CEX scores before and after implementation, analyzing self-assessment data, and collecting survey feedback from students and instructors.

Preliminary Results: Initial findings indicate significant improvement. Mini-CEX scores increased from 35 to 42 (20% gain) after a two-week rotation with the tool. Self-assessment data reflected enhanced confidence in patient evaluations, and clerks provided positive feedback on usability and educational value.

Conclusion: This study demonstrates that an interactive, structured patient evaluation tool enhances clerks' systematic assessment skills and clinical reasoning. These findings support the integration of digital tools into medical education, offering an innovative model that links theoretical learning with practical application.

The Application of generative AI in holistic care and medical education: Clinical integration and transformative strategies from a southern Taiwan medical center

生成式 AI 在全人照護與醫學教育的應用

Chia- Te Liao
廖家德
Chi Mei Medical Center, Deputy Director of Medical Education Center, Tainan, Taiwan, ROC
奇美醫院 實證醫學暨醫療政策中心

The emergence of generative artificial intelligence (AI) is transforming healthcare and medical education, offering novel pathways for personalization, efficiency, and reflection. This presentation outlines the current developments and clinical adoption strategies of generative AI, with practical insights drawn from ongoing implementations at a medical center in southern Taiwan.

In the realm of holistic care, generative AI is being applied to support interprofessional practice (IPP) and interprofessional education (IPE). AI-driven tools facilitate collaborative communication by generating patient narratives, simulating therapeutic dialogues, and assisting interdisciplinary teams in co-constructing care plans that address not only physical needs, but also psychological, social, and spiritual dimensions. These applications enhance mutual understanding among professionals and deepen patient-centered awareness.

In medical education, generative AI is being progressively integrated into the frameworks of competency-based medical education (CBME), including Entrustable Professional Activities (EPA), milestone-based evaluations, and faculty development programs. In parallel, an AI-enhanced e-portfolio system is being developed to support individualized learning plans, provide tailored formative feedback, and serve as an AI mentor and coach to guide learners' self-directed growth. Moreover, the medical humanities curriculum is undergoing transformation to incorporate AI-supported reflective writing, aiming to foster empathy, critical thinking, insight, and moral sensitivity. A strategic emphasis on digital empowerment equips students with AI literacy and nurtures curiosity-driven learning.

Looking forward, key challenges include safeguarding patient data, addressing algorithmic bias, ensuring transparency in AI decision-making, and mitigating digital inequities in access and usage among medical trainees. Ethical considerations—such as the preservation of humanistic values in AI-augmented learning and the responsible use of synthetic content—will require careful governance. Nonetheless, with a human-centered and ethically guided approach, generative AI holds great potential to enhance the compassion, agility, and resilience of future healthcare systems and educational paradigms.

Keywords: Generative AI; Holistic Care; Interprofessional Practice; Medical Education; CBME; EPA; e-Portfolio; AI Mentor; Digital Empowerment; Reflective Practice; Ethical AI; Digital Divide

The roles of pharmacists in parenteral nutrition therapy team: An example of constructing a comprehensive procedure for neonatal compounding parenteral nutrition care with multidisciplinary teamwork and information technology at a medical center

藥師於靜脈營養小組之角色：以某醫學中心跨團隊應用資訊科技周全建構新生兒配製型靜脈營養照護流程為例

Pei-Chen Lee

李珮甄

Department of Pharmacy, Taipei Veterans General Hospital, Taipei, Taiwan, ROC

臺北榮民總醫院 藥學部

Pediatric parenteral nutrition is a complex therapy with dozens of ingredients, each with clinical rationales, dosing implications, and interaction potential. Meanwhile, its ingredients tend to be in short supply. Therefore, healthcare institutions should implement policies and procedures that ensure professionals can demonstrate competency to optimize the delivery of safe and effective therapy.

A team was constructed with a clinical pharmacist, pediatric physicians, and heads of departments at a 3,160-bed medical center to optimize pediatric parenteral nutrition. The process of preparation, prescribing, order verifying, compounding, and administration was assessed and reformed by reviewing the literature.

During the past 10 years, five pediatric ingredients were adapted for compounding individualized parenteral nutrition. Several ingredient shortage events were solved, and the impact on patients was minimized. A user-friendly e-prescribing tool, concerned with daily fluid, age, weight-based dosing was established in 2018. The program connected the prescribing system and compounding pharmacy, with a calculation function has implemented in 2024. The pharmacy is equipped with two automated compounding devices (Baxter Exacta Mix® 2400), compounding around 2,000 pediatric parenteral nutrition prescriptions safely and efficiently yearly. Additionally, compounding parenteral nutrition and intravenous fat emulsion for neonates is administered via a 0.22 and 1.2 μm filter for safety considerations.

With multidisciplinary teamwork and information technology, we construct a comprehensive procedure and improve the quality of neonatal parenteral nutrition care.

The interplay of nutrition and medicine: Development trends of Evidence-Based Clinical Nutrition in medical education

營養與醫學的和弦：實證臨床營養學在醫學教育的發展趨勢

Shin-Huei Liu

劉馨惠

Internal Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC

臺北榮民總醫院 一般內科

Evidence-Based Clinical Nutrition (EBCN) represents a fundamental shift in how nutritional care is approached, emphasizing the systematic and rigorous process of identifying, critically appraising, synthesizing, and applying the most current and robust scientific evidence to inform clinical nutrition decision-making. This approach moves beyond relying solely on anecdotal experience or the pronouncements of authority figures, instead prioritizing findings from well-designed research studies. The core tenets of EBCN ensure that nutritional interventions are grounded in the best available data, leading to more effective and patient-centered care. This necessitates a thorough understanding of research methodologies, statistical analysis, and the ability to discern the strength and applicability of various forms of evidence, ranging from randomized controlled trials to observational studies and systematic reviews. The ultimate goal of EBCN is to optimize patient outcomes by ensuring that nutritional recommendations are not only theoretically sound but also demonstrably effective in real-world clinical settings.

Concurrently, medical education is experiencing a significant paradigm shift away from traditional pedagogical models that heavily relied on the transmission of knowledge based primarily on the instructor's experience and hierarchical authority. The modern approach to medical training increasingly focuses on actively cultivating students' higher-order cognitive skills, including critical thinking, problem-solving, and analytical reasoning. Furthermore, there is a strong emphasis on fostering self-directed learning, empowering students to take ownership of their education and develop the skills necessary for continuous professional development. Lifelong learning is now recognized as an essential competency in the rapidly evolving field of medicine, requiring graduates to be adept at independently seeking, evaluating, and integrating new knowledge throughout their careers. This transformation in medical education inherently places a greater emphasis on developing students' capacity for critical thinking and the ability to effectively appraise scientific literature, with a particular focus on independently evaluating nutrition-related research publications to inform their future clinical practice.

The nutraceutical industry from R&D, regulation to marketing and its social responsibility

營養品產業從研發、法規到市場以及其社會責任

Chien-Chih Chiu

邱建智

Fresenius Kabi Taiwan Ltd., Taipei, Taiwan, ROC

台灣費森尤斯卡比股份有限公司

Join hands with the healthcare professionals to protect the health of patients.

With the prevalence of chronic diseases and the rise in health awareness, the role of nutritional supplementation in holistic care is becoming increasingly important. Every aspect of the nutraceutical industry, from R&D to regulation to marketing, is closely related to clinical needs, and provides more tools for medical workers to assist in care.

In the R&D stage, the industry continues to integrate nutritional science, clinical research and personalized nutrition trends to develop products for specific ethnic groups (such as the elderly, postoperative, cancer and specific disease patients, etc.) to enhance the empirical basis and application value. At the same time, it also cooperates with the medical side to conduct clinical trials, observational studies and real-world data analysis to strengthen product safety and efficacy verification.

In terms of regulations, the industry must strictly abide by food and drug management practices, ensure the transparency and compliance of ingredients and labeling, and establish a reliable basis for doctors and patients to choose. This also helps to evaluate and recommend products in clinical practice, reducing misleading and confusion.

In addition to product promotion, the market emphasizes communication and education with medical professionals. Many practitioners are investing in patient education, nutrition intervention programs, and cross-team collaboration to support greater synergies among healthcare professionals in improving patient compliance, nutritional status, and overall outcomes.

The ultimate responsibility of the nutrition industry is not only to produce products, but also to participate in the health care ecosystem. In the future, through cross-border collaboration, professional exchanges and the establishment of common standards, we will have the opportunity to create a people-centred and prevention-oriented healthcare environment to improve patients' quality of life and health outcomes.