Education Reform and Development, 2026, Volume 8, Issue 3
https://ojs.bbwpublisher.com/index.php/ERD
Online ISSN: 2652-5372
Print ISSN: 2652-5364

Construction of an Integrated Training System for First-Class Stomatology Major and Top-Tier Talents Under the Background of New Medical Science: A Case Study of Stomatology Major at Kunming Medical University

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Abstract: The "Outline for Building a Powerful Education Country (2024–2035)" clearly puts forward the goal of improving the quality of independent talent training, and the construction of "New Medical Science" focuses on cultivating high-level innovative interdisciplinary talents. In response to the current deficiencies in stomatology talent training at Kunming Medical University, there is an urgent need to promote professional reform and innovation. The reform goal is to construct a new model of stomatological education that deeply integrates first-class professional construction and top-tier talent cultivation, forming a coordinated development mechanism of "first-class professional construction - top-tier talent cultivation".Key focuses include building a characteristic professional system and innovating the "physician-scientist" training paradigm. Specific measures include reforming the talent training model (such as optimizing the curriculum system, strengthening the cultivation of innovative and entrepreneurial capabilities and international perspectives, and reforming teaching evaluation methods), further improving the curriculum system construction, and optimizing the allocation of educational and teaching resources. It is argued that establishing a talent training system centered on scientific research and innovation capabilities is an inevitable requirement for promoting the high-quality development of stomatology talent training.

Keywords: New medical science; Stomatology; Top-tier talents; First-class major; Innovation and entrepreneurship

Online publication: April 10, 2026

1. Background and significance

The "Outline for Building a Powerful Education Country (2024–2035)" clearly identifies "comprehensive improvement in the quality of independent talent cultivation and the continuous emergence of top-tier innovative

talents" as an important phased goal for building a powerful education country [1]. "New Medical Science" focuses on cultivating high-level interdisciplinary innovative talents who meet the needs of the national health strategy [2], in order to adapt to the development of modern medical science and technology and changes in social needs. In response to the above goals, there are obvious deficiencies in the current stomatology talent training at our university: first, the contradiction between traditional stomatological education and the demand for interdisciplinary talents in "New Medical Science"; second, the lack of a collaborative mechanism between first-class professional construction and top-tier talent training; third, the insufficient regional development needs and international competitiveness. Against this background, promoting the reform and innovation of existing medical majors, advancing in-depth interdisciplinary integration [3], optimizing the content of existing courses, supplementing "medical +" interdisciplinary related courses, and constructing an innovation-driven mechanism of "early clinical practice, early scientific research, and early innovation" have become important measures to promote the innovative development of disciplines and the training of top-tier talents [4].

2. Reform goals and measures

2.1. Goals

Form a new model of stomatological education integrating "first-class professional construction top-tier talent selection".

2.1.1. Professional construction goals

Based on regional medical needs and radiating to South and Southeast Asia, construct a world-class stomatology professional system with distinct Yunnan characteristics, forming a globally influential hub of stomatological education that serves the Healthy China strategy and the development of Yunnan's big health industry,forming a globally influential highland of stomatological education, and serving the Healthy China strategy and the development of Yunnan's big health industry.

2.1.2. Talent training goals

Innovate the "physician-scientist" training paradigm and establish an independent training system for top-tier talents centered on scientific research and innovation capabilities:

(1) Implement the "Three-Early" (early clinical practice/early scientific research/early innovation) teaching-research integration model to cultivate innovative talents with complex problem-solving abilities, international perspectives, and interdisciplinary literacy;

(2) Construct a curriculum system of "solid foundation - broad vision - grand pattern", strengthen scientific research thinking training and innovative practice, and ensure that graduates can independently produce innovative research results;

(3) Form a replicable selection mechanism for top-tier talents, focusing on cultivating interdisciplinary medical talents with both clinical competence and scientific research innovation capabilities [5];

(4) Establish an interdisciplinary platform of "Stomatology +" to meet the development needs of the country's new quality productive forces, and promote cutting-edge disciplinary breakthroughs and the improvement of regional medical standards [6].

2.2. Measures

2.2.1. Reform of talent training model

(1) Build a curriculum system of "Stomatology +" compulsory and elective courses for top-tier stomatology talents under the background of New Medical Science [7]

(a) Take the opportunity of undergraduate education teaching audit and evaluation to revise and improve the current talent training program;

(b) Based on the existing talent training program, offer cutting-edge disciplinary courses, oral English improvement courses, interdisciplinary integrated courses, scientific research training courses, and social practice courses for students in the top-tier class.

(2) Strengthen the cultivation of students' innovative and entrepreneurial spirit [8,9]

(a) Open key laboratories and virtual simulation laboratories of the college to students in the top-tier class: increase the proportion of research-based learning projects and practical skill training projects to achieve 100% scientific research training;

(b) Establish innovative open experimental projects and funds for undergraduates in the top-tier program to promote the integration of science and education in project-based talent training;

(c) Consolidate the student-centered education role, and regularly invite outstanding representatives from domestic and foreign cooperative universities, research institutes, and private dental enterprises to give online and offline lectures on students' innovation and entrepreneurship and scientific research.

(3) Strengthen the cultivation of students' international perspectives

Select students to study abroad, visit, participate in competitions, and attend international conferences at cooperative universities at home and abroad. For example, the annual summer exchange program with the University of Alberta in Canada, the international exchange program with Osaka Dental University in Japan, and the summer camp program at the Faculty of Dentistry, The University of Hong Kong. Every year, outstanding student representatives are regularly selected to participate in the Annual Conference of the International Dental Collaboration for the Mekong Region (IDCMR) and the Annual Conference of the Southeast Asian Association for Dental Education (SEAADE);

(4) Comprehensive reform of teaching evaluation

(a) Evaluate and assess students' entire learning process. This can also increase process-oriented assessment, strengthen online exams through the Learning Pass platform, and increase the frequency of course unit tests (no less than 3 process-oriented assessments per course per semester); further explore the curriculum evaluation and management of the "non-standard answer" assessment method. Encourage students to participate in teachers' scientific research projects, and include the evaluation of students' participation in various scientific and technological competitions and academic activities in the comprehensive assessment to encourage and recognize students' personalized and innovative development achievements;

(b) Conduct dynamic evaluation and assessment of students in the top-tier class, implementing an elimination system. Students entering the top-tier class need to meet the minimum assessment indicators in each assessment cycle (academic year) to proceed to the next learning cycle; if they fail to meet the assessment indicators, they will be deemed to have voluntarily withdrawn from the top-tier class, and other qualified students will be supplemented in turn, with dynamic merit-based supplementation during the assessment cycle.

2.2.2. Construction of curriculum system

(1) Curriculum Setting: After enrollment, top-tier students study humanities and social sciences, general education courses, basic medical courses, and stomatology professional courses in the same way as ordinary undergraduate students of the major; students who are selected into the top-tier class will additionally complete the study of personalized, customized collaborative training courses during the training period;

(2) Construct an exclusive "personalized customized collaborative training" curriculum module for students in the top-tier program. In addition to completing the compulsory and public elective courses specified in the existing talent training program, add cutting-edge disciplinary courses, English improvement courses, interdisciplinary integrated courses, scientific research training courses, and no less than 160 class hours of social practice for students in the top-tier class. Credits earned from the added courses can be exchanged with some compulsory and elective courses specified in the talent training program of the ordinary five-year stomatology major.

2.2.3. Resource allocation

(1) Optimal Allocation of Teaching Resources

(a) Strengthen high-level faculty: Select academic masters and well-known experts and scholars who love education, have profound attainments, and possess both virtue and ability as mentors for top-tier students, forming a "double mentor" team of academic mentors and scientific research mentors to provide students with personalized academic guidance and career planning;

(b) Build "digital and intelligent" teaching resources: Introduce AI teaching resources, strengthen the digital and intelligent construction of practical teaching resources such as laboratories and clinical internship bases, and cultivate students' ability to solve complex and difficult problems.

(2) Preferential Allocation of Scientific Research Resources

(a) Open scientific research platforms: Prioritize the opening of the Yunnan Key Laboratory of Stomatology to top-tier students, encouraging students to engage early in projects, laboratories, and teams, and cultivating their scientific research and innovation capabilities.

(b) Fund scientific research projects: Establish special funds to support scientific research projects participated by top-tier students, encouraging them to conduct in-depth research and explore unknown fields.

(3) Expansion of International Cooperation and Exchange Resources

(a) Introduce high-quality foreign educational resources: Learn from advanced foreign stomatological education concepts and methods, introduce high-quality online and offline educational resources, and improve the quality and level of top-tier talent training.

3. Discussion

The training goal of top-tier talents is "physician-scientists", with a focus on consolidating the cultivation of innovative scientific research capabilities in stomatology. Globally, although there is a lack of formal "physician-scientist" training paths [10], most medical schools have improved the MD/PhD joint training model [11], such as the Medical Scientist Training Program in the United States [12] and the physician-scientist training model in Canada. According to a report in the United States, the percentage of graduating medical students who engaged

in research activities during medical school has been increasing year by year; in 2020, 82.5% of prospective graduates had research experience, and 55.1% of medical students had independently or jointly written research papers [13]. These studies indicate the necessity of establishing an independent training system for top-tier talents centered on scientific research and innovation capabilities.

First-class professional construction effectively enhances the core competitiveness of disciplines by systematically integrating faculty teams, curricula, and scientific research platforms. While serving national strategic needs, it promotes the balanced allocation of educational resources relying on digital technology. The training of top-tier innovative talents has become a core link in implementing the fundamental task of fostering virtue through education. With the "trinity" education system as the core, it addresses the homogenization problem of traditional medical education and adapts to the rapidly evolving industrial and technological needs. Although various universities have achieved phased results through first-class professional construction and/or top-tier talent training, they are constrained by the inertia of traditional educational concepts, and still show deficiencies such as a lack of collaborative mechanisms, rigid educational models, and biased evaluation orientations.

The undergraduate curriculum setting of stomatology majors in China emphasizes basic clinical medical courses. For example, in the five-year undergraduate program at West China School of Stomatology, Sichuan University, the number of clinical medical courses is equivalent to that of stomatology professional courses. This model is conducive to better meeting social public health needs, but the professional capabilities and scientific research innovation capabilities of undergraduate graduates are relatively weak [14]. In addition, there are problems such as the lack of scientific research content in the curriculum setting of colleges and universities, a poor scientific research atmosphere, a lack of professional guidance, and insufficient support for students' participation in various scientific research and innovation projects. At present, the talent training mechanism that breaks disciplinary and professional barriers and deepens interdisciplinary integration has gradually shown its effectiveness. For example, the "three-dimensional system of science and education - scientific research - technological innovation" constructed by the School of Stomatology, Shanghai Jiao Tong University [15].

4. Conclusion

In summary, by constructing an integrated training system of "first-class major + top-tier talents", exploring a new model of "solid foundation, strong interdisciplinary integration, and emphasis on innovation" in medical education, and promoting the reform of New Medical Science education; taking "early clinical practice, early scientific research, and early innovation" as the path, breaking the barriers between professional construction and talent selection, forming an independent training mechanism centered on scientific research and innovation capabilities, and addressing the bottlenecks in top-tier talent training; based on Yunnan's geographical advantages, radiating South and Southeast Asia, cultivating stomatology talents with both international perspectives and regional characteristics, helping the upgrading of the health industry and "Belt and Road" medical cooperation, and serving national and local strategic needs.

Funding

Key Educational and Teaching Research Project of Kunming Medical University in 2025 (Project No.: 2025-JY-Z-07); General Educational and Teaching Research Project of Kunming Medical University in 2025 (Project No.: 2025-JY-Y-123)

Disclosure statement

The authors declare no conflict of interest.

References

[1] The Communist Party of China Central Committee, The State Council, 2025, Outline for Building a Powerful Education Country (2024–2035), Beijing,

[2] Tang SF, Yang Q, Qu JL, et al., 2025, Exploration and Practice of Interdisciplinary Medical Talent Training Model Under the Background of New Medical Science. China Medical Education Technology, 39(06): 742–747.

[3] Tang L, Gui H, Wang C, 2024, Reconsideration of New Medical Science Construction Under the Background of Healthy China. Journal of National Academy of Education Administration, (01): 51–57.

[4] Niu XY, Guo XK, 2021, Medical Education Reform and Talent Training Under the Background of "New Medical Science". China Higher Medical Education, (05): 1–2.

[5] Yang CH, Wang Z, 2023, Reform and Exploration of the "Medical + X" Interdisciplinary Talent Training Model. Medical Education Research and Practice, 31(01): 11–15.

[6] Ma Z Q, Xu LX, Han W, et al., 2022, Exploration of Interdisciplinary Integration in Cultivating New Medical Science Talents. Chinese Journal of Medical Education, 42(4): 292–295.

[7] Zhou T, Dai L, Xu R, et al., 2024, Evaluation of the Implementation Effect of "Stomatology +" Elective Courses Under the Background of New Medical Science. Scientific Research Achievements and Communication, (7): 201–205.

[8] Wang M, Zhang Z, Chen LL, 2024, Exploration and Practice of Interdisciplinary Stomatology Talent Training Under the Background of New Medical Science. Medical Education Management, 10(06): 687–691.

[9] Ge SH, He W, Shao JL, et al., 2023, Exploration and Practice of a "Five-in-One" Undergraduate Training System Under the Background of New Medical Science Construction — A Case Study of the School of Stomatology, Shandong University. Chinese Journal of Social Medicine, 40(03): 273–276.

[10] Li Q, Wollny K, Twilt M, et al., 2022, Curricula, Teaching Methods, and Success Metrics of Clinician-Scientist Training Programs: A Scoping Review. Academic Medicine, 97(9): 1403–1412.

[11] Williams CS, Rathmell WK, Carethers JM, et al., 2022, A Global View of the Aspiring Physician-Scientist. eLife, 11.

[12] Association of American Medical Colleges, 2026, 2025 FACTS: Enrollment, Graduates, and MD-PhD Data, visited on February 24, 2026, https://www.aamc.org/data-reports/students-residents/report/factsmissing link.

[13] Garrison HH, Ley TJ, 2022, Physician-Scientists in the United States at 2020: Trends and Concerns. FASEB Journal, 36(5): e22253.

[14] Ye CC, Zhang Y, Kobayashi H, 2021, Higher Stomatological Education Systems and Scientific Research Talent Training in China, Japan, and the United States. Chinese Journal of Stomatological Research (Electronic Edition), 15(03): 173–177.

[15] Zhu WY, Wang ZS, Zhang YJ, et al., 2023, Construction and Improvement Path of the Whole-Process Practical Education System for Stomatology Students Under the Background of Chinese-Style Modernization — A Case Study of the "Jiuwei" Clinic Labor Education Course at the School of Stomatology, thesis, Shanghai Jiao Tong University.