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# Statistical analysis of research integrity construction in 466 Chinese universities with medical programs

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The medical field is prone to research misconduct, with serious cases exposed in China in recent years. In compliance with the guidelines from the Ministry of Education requiring higher education institutions to establish dedicated websites for research integrity, this study conducted online statistics on 466 universities to investigate the status of research integrity in Chinese universities with medical programs. Analysis of the data collected from official websites revealed progress in research integrity construction, but numerous issues persist, including scattered information, infrequent publication of warning cases or advanced deeds, lack of dedicated research integrity personnel, and limited disclosure of contact, whistle-blowing channels and annual reports. Therefore, this paper proposes four improvement recommendations and provides incentive measures to ensure their implementation.

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## Introduction

In recent years, China has seen a rise in research misconduct, particularly in the medical field, attracting significant attention from domestic and international communities. In March 2015, the UK's BMC Publishing Group retracted 41 biomedical articles from Chinese scholars due to "improper influence on peer-review processes and existing issues" (Yangguang Net, 2015). In April 2017, Springer Publishing Group retracted 107 medical articles involving "peer-review fraud" by Chinese scholars (Xue et al., 2020). In May and November 2022, Chinese Ministry of Science and Technology respectively reported 24 and 8 cases of medical research misconduct investigations (Ministry of Science and Technology of the People's Republic of China, 2022). The National Natural Science Foundation of China's official website released three batches of notifications on the investigation results of research misconduct cases in 2022, with a total of 68 cases reported. Among these, 50 cases were in the medical field (National Natural Science Foundation of China, 2022), accounting for 73.5%. Continuous research misconduct in medicine severely affects the healthy development of Chinese medical research and the international reputation of medical professionals, making the institutionalization of research integrity construction in medicine imperative.

Foreign scholars began to study research misconduct earlier than their Chinese counterparts, who did not place emphasis on the topic until the late 1980s (Zu, 2010), but related research significantly increased after 2000 (Zhou, 2020). Misconduct in research is variously defined by different scholars. Scholars from abroad define research misconduct from their perspectives, encompassing reduction, selection, forgery (Babbage, 1830), plagiarism on various scales (Merton, 1973), unjust project review (Fox, 1994), distortion of research reports (Korenman et al., 1998), improper citation, inappropriate authorship, omission or distortion of research information (Fanelli, 2013), and violating confidentiality, human or animal research violations (Resnik et al., 2015). Cheating in exams, plagiarism, and alteration in academic paper writing are also widely discussed (Fang et al., 2012). Chinese scholars usually discuss misconduct from the broad sense of morality to the specific behaviors. This includes violation of research authenticity (Chen, 2013), academic ethics (Chang and Jiang, 2008), and even specifics like data fabrication, falsification, plagiarism (Cao, 2004), misuse of authorship, providing false information (Liu et al., 2007).

Scholars attribute the emergence of these unscrupulous behaviors to various factors, which can be broadly categorized into personal internal factors and external environmental influences. Personal factors include values (Hackett, 1994), learning experience (Sowden, 2005), psychological pressure (Yamazaki and Shigeaki, 2005) and moral literacy (Harding et al., 2007). Additionally, academic status and promotion pressure are also significant factors (Chang and Jiang, 2008). Contrastingly, environmental factors influencing research misconduct bifurcate into organizational internal and external influences. Internally, pivotal aspects include peer influence (Teodorescu and Andrei, 2009), the educational milieu (Makarova, 2019), motivating interests and evaluation mechanisms (Han and Xu, 2005), academic disciplinary systems (Jiang, 2009), and the academic ethical climate (Chang et al., 2009). Externally, these factors often encompass the new technology, the Internet (Elshafei and Jahangir, 2020), and the hypercompetition (Fang and Casadevall, 2015). In summary, social, institutional, and personal factors jointly influence the generation of research misconduct.

Currently, the primary strategies for addressing the issue of research misconduct involve a composite approach of "self-discipline" and "external regulation". Scholars advocating for academic self-discipline emphasize its importance as a preventive

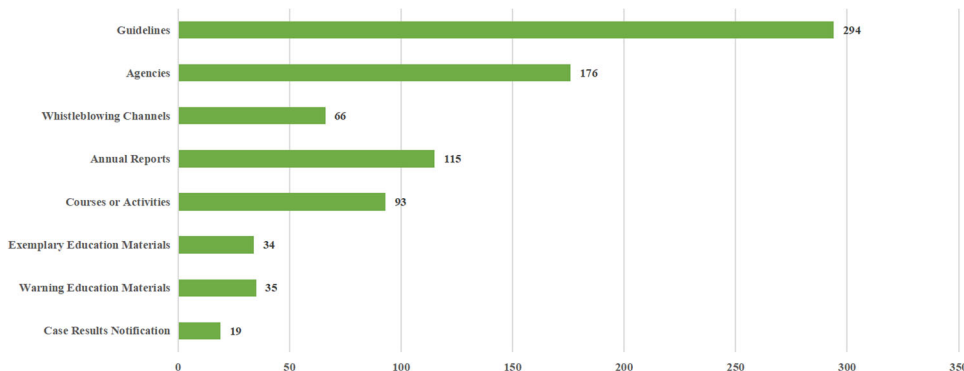
measure. They believe that cultivating moral education can curb research misconduct at its source (Feng, 2012). Due to the high incidence of research misconduct, many scholars advocate going beyond single self-discipline strategy, using more external regulation strategy, which emphasizes improving legal systems, responsibility systems (Zhang, 2015), and playing a positive role by third-party institutions (Kong and Zhang, 2013). As the research progresses, more scholars are studying composite governance strategies, such as establishing a diversified legal responsibility system, reforming academic evaluation system, strengthening technical construction, and more (Liu, 2018).

In conclusion, scholars from both domestic and abroad have conducted in-depth studies on the definition, influencing factors, and governance strategies of research misconduct. However, there is a lack of specific studies on the overall status and improvement strategies of research integrity in Chinese universities with medical programs. Therefore, this study intends to analyze the achievements and existing issues of research integrity in such universities and propose corresponding improvement suggestions.

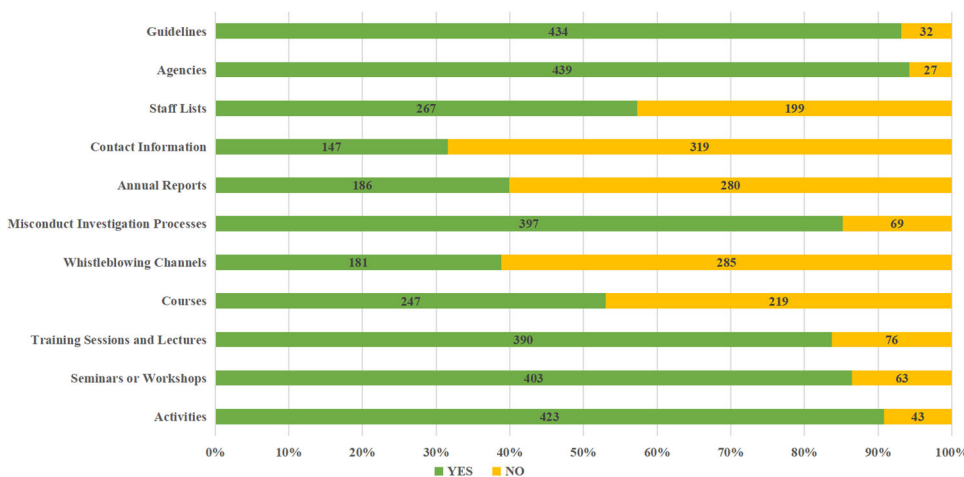
## Data sources and research methods

In recent years, various departments like the Ministry of Education, the Ministry of Science and Technology, and the National Health Commission have emphasized the need for constructing research integrity in higher education institutions. In 2014, the Ministry of Education issued the *Notice on the Publication of Academic Integrity Construction "Three Implementations, Three Disclosures" Related Materials* on the Internet, requiring that "all domestic universities strictly implement the "Three Implementations, Three Disclosures" (i.e., academic integrity office, academic norms and regulations, and mechanisms for investigating and handling misconduct), modify and improve their academic integrity columns, and standardize the content posted on the websites (Ministry of Education of the People's Republic of China, 2014)." In 2016, the Party Group of the Ministry of Education of the Communist Party of China issued the *"Notice of the Party Group of the Ministry of Education of the Communist Party of China on Strengthening Academic Integrity Construction Responsibility and Implementing Accountability Mechanism,"* requiring that "a dedicated column for academic integrity construction should be established on the unit's website, academic integrity reports should be published, and the investigation and handling results of scientific research misconduct should be disclosed (Ministry of Education of the People's Republic of China, 2016a, 2016b)." According to the "Three Implementations, Three Disclosures" framework from the Ministry of Education and other departments, the analysis of the content on the official websites of these universities can provide insights into the state of research integrity construction in China. Hence, this study aims to perform a statistical analysis of research integrity construction in Chinese universities with medical programs, based on the content displayed on their official websites. Even though some universities lacked dedicated columns or thematic websites on research integrity, they did publish related information. To supplement our data, we also conducted additional searches using commonly-used search engines in Mainland China, resulting in two datasets (refer to Figs. 1 and 2).

This study, following the "Three Implementations, Three Disclosures" requirement of the Ministry of Education, utilized a cross-sectional web data analysis method, targeting the 466 universities offering medical specialties as announced by the National Center for Medical Education Development in August 2022. The specific research methods were as follows:



**Fig. 1 Content of research integrity columns and thematic websites.** which presents the categorized statistics of information posted on the research integrity columns and thematic websites among 320 out of 466 Chinese universities with medical programs.



**Fig. 2 Implementation status of research integrity measures.** which presents the categorized statistics of research integrity information published by 466 Chinese universities with medical programs, as gathered through a comprehensive online search.

- (1) Determine web data collection items. The data collection items related to the status of research integrity construction in universities were determined based on the requirements of the Ministry of Education’s documents. Specific items included:
  - I. Construction status of research integrity columns and thematic websites;
  - II. Publication status of research integrity guidelines;
  - III. Publication status of research integrity agencies, staff lists, contact information, and annual reports;
  - IV. Publication status of misconduct investigation processes and whistleblowing channels;
  - V. Publication status of research integrity courses and events.
- (2) Web data collection. The official websites of these universities were visited, including pages such as Information Disclosure, Research Department or Technology Department, Student Affairs, Academic Affairs, Development Planning, Human Resources, and Graduate College, etc., to locate academic integrity columns or thematic websites and collect any related content on research integrity. Meanwhile, search tools like Baidu, Sogou and Bing were used to supplement data by searching for “university name + keyword”. The search keywords included “research integrity”, “academic integrity”, “academic moral”, “scientific moral”, “academic guidelines”, “academic atmosphere”, “research misconduct”, “academic misconduct”, “deviant research”, and “academic fraud”.
- (3) Figure creation. The data collected from visiting official websites and using search tools were organized and input into an Excel spreadsheet, from which statistical figures were generated.
- (4) Data analysis. Based on the figure results, the current status of research integrity construction in the 466 universities with medical programs was analyzed, their achievements and existing issues identified, and potential solutions to these issues discussed.

The data collection period was from January 1, 2023, to March 20, 2023.

**Results**

**Construction status of research integrity columns and thematic websites.** Websites are the primary means for universities to release information externally and play a crucial role in promoting research integrity education. The construction and maintenance of websites and the timeliness of information disclosure should not be overlooked. The statistics show that 146 (~31.33%) out of 466 universities did not have a column or thematic website. There were 35 (~7.51%) universities with thematic websites, and 285 (~61.16%) universities had columns. Among them, 159 universities had columns on their research or student affairs websites, and the remaining 126 were on their information disclosure websites. In the retrieved columns or websites, 75 (~16.09%) universities had not updated their research integrity information for over four years.

The information published in the research integrity thematic websites and columns of the 320 universities can be divided into eight categories: “Guidelines” (~63.09%), “Agencies” (~37.77%), “Whistleblowing Channels” (~14.16%), “Annual Reports” (~24.68%), “Courses or Activities” (~19.96%), “Exemplary Education Materials” (~7.30%), “Warning Education Materials” (~7.51%), and “Case results Notification” (~4.08%). The publication situation is shown in Fig. 1.

**Publication status of research integrity guidelines.** The establishment of academic norm systems is crucial for research integrity in higher education institutions. Internal academic guidelines, as the implementation of research integrity policies, directly influence the research conduct of faculty and students (Yuan et al., 2019). As shown in Fig. 2, among 466 universities, 415 (~89.06%) have developed dedicated documents of research integrity guidelines. 19 universities (~4.08%) only stipulate academic ethics provisions adherence for teachers and students in their *Student Regulations and Guidelines for Faculty Ethics Construction*, without separate documents of research integrity guidelines. In contrast, 32 universities (~6.87%) lack any documents of research integrity guidelines.

**Publication status of research integrity agencies, staff lists, contact information, and annual reports.** Establishing dedicated and independent departments or offices for research integrity reflects an university’s commitment to fostering research integrity. Disclosing personnel lists and annual reports for these departments further indicates a university’s level of research integrity. According to the statistical results (Fig. 2), among 466 universities, 27 (~5.79%) had no identifiable agencies specifically responsible for research integrity. 231 (~49.57%) universities delegated research integrity promotion and construction to academic committees, with 69 having an academic committee secretariat affiliated with their science and technology departments. 208 (~44.64%) universities had academic ethics committees or academic integrity construction leadership groups under their academic committees, focusing on research integrity-related work.

Meanwhile, 199 (~42.70%) of the 466 universities did not disclose their research integrity personnel lists, and 319 (~68.45%) did not provide contact information.

Additionally, 280 (~60.09%) universities did not have retrievable research integrity reports, and among the 186 universities with accessible reports, 53 had not updated their reports in over three years.

**Publication status of misconduct investigation processes and whistleblowing channels.** Establishing research misconduct investigation processes, disclosing whistleblowing channels, and publicizing research misconduct investigation results are crucial aspects of research misconduct punishment. These measures effectively handle research misconduct cases, detect issues promptly, serve as a deterrent, protect the legitimate academic rights of faculty, students, and other academic professionals, and promote innovation and development in higher education institutions. In 2016, the Ministry of Education issued Order No. 40, *Measures for the Prevention and Handling of Academic Misconduct in Higher Education Institutions*, which formed the basis for misconduct investigation processes in each institution (Ministry of Education of the People’s Republic of China, 2016a, 2016b). The statistical results (Fig. 2) show that 69 out of 466 universities (~14.81%) had no retrievable research misconduct investigation processes, and 285 (~61.16%) did not disclose their whistleblowing channels. Moreover, since the public disclosure of research misconduct investigation results is directly

related to whether misconduct has occurred, some universities have not yet conducted such investigations. Therefore, although the Ministry of Education’s document requires the disclosure of research misconduct investigation results, this content has not been included in the statistical scope.

**Publication status of research integrity courses and events.** In the past decade, academic research on research integrity has gradually shifted from detecting and punishing misconduct to promoting desired behaviors (Löfström et al., 2015). The academia is particularly interested in exploring methods to prevent research misconduct, as studies have shown that regardless of severity, research misconduct is due to a lack of relevant knowledge (Kaiser, 2014). It is evident that promoting research integrity education in higher education institutions is of utmost importance. In addition to the aforementioned information, the statistics also examined the research integrity courses and related events at 466 universities. The results revealed that 23 universities (~4.94%) did not offer any courses or related events. Among the remaining 443 universities (Fig. 2), 247 (~53.00%) offered academic norm-related courses; 390 (~83.69%) held training sessions and lectures; 403 (~86.48%) organized research integrity-themed seminars or workshops; and 423 (~90.77%) carried out research integrity-themed activities.

## Discussion

Since the release of the “Three Implementations, Three Disclosures” document, Chinese universities with medical programs have responded by successively announcing research integrity guidelines and research misconduct investigation processes, establishing agencies, and creating dedicated columns or thematic websites. Overall, the statistics show that Chinese universities with medical programs have achieved some progress in research integrity construction while revealing some issues.

**Achievements.** Firstly, the statistical results show that a significant majority (over 85%) of sampled universities have implemented specialized systems for academic norms and procedures for investigating research misconduct. This suggests that the initial framework for research integrity in Chinese universities with medical programs is in place. Secondly, our data reveals that over 90% of the sampled universities have put in place dedicated committees or working groups tasked with overseeing this construction, signifying effective organizational setup. Thirdly, an overwhelming majority (over 95%) of the sampled universities have conducted both online and offline courses and events focused on academic norms and research integrity, such as: conducting basic knowledge tests on scientific ethics and academic guidelines; holding thematic lectures on scientific ethics and integrity; organizing graduate student competitions in “academic ethics and research integrity” case analysis and academic integrity debate contests; holding education and training sessions; and carrying out online learning activities on graduate students’ academic ethics education. Lastly, nearly 70% of the sampled universities have complied with documentation requirements by establishing dedicated columns or websites.

**Issues.** First, when comparing the information disclosed through research integrity columns or thematic websites to that on university official websites, it’s evident that the dissemination of research integrity information is scattered across various platforms in Chinese universities with medical programs. These platforms should not only serve promotional functions but also act as centralized hubs for announcing policies, enabling research information search, and reporting misconduct. The statistics



show that 146 universities do not have the columns or thematic websites, and 75 of them fail to update or maintain them regularly, possibly due to inadequate staffing or lack of awareness of their functions and roles. Additionally, only 35 universities have established dedicated websites to centrally disclose related information, while over 60% of universities disseminate research integrity information through scattered channels such as the Science and Technology Department, Student Affairs Office, or Information Disclosure Network. Consequently, visitors face difficulties in locating useful information and must access multiple department websites to find details on responsible institutions, academic regulations, and reporting contact methods.

Second, there is a noteworthy absence of the disclosure of warning cases and exemplary achievements. Our data shows a scarcity of such cases being publicized. Disclosing such cases allows for the analysis of mistakes and misconduct to educate and alert faculty and students to potential risks, thereby enhancing research integrity awareness and reducing similar incidents. Sharing exemplary achievements promotes positive values, stimulates interest, and encourages motivation. Exemplars' experiences and methods provide practical guidance for students to better address issues. The lack of warning cases and exemplary achievements hinders the development of a strong research integrity awareness and the prevention of research misconduct among faculty and students to some extent.

Third, a significant number of universities are lacking in both dedicated personnel for research integrity and public whistleblower channels. Having dedicated personnel with publicly available contact information can streamline processes, improve efficiency, and ensure timely handling of research misconduct. Statistics reveal that most personnel are part-time members from various departments, not specialized teams. Moreover, 68.45% of universities fail to disclose contact information for committees or working panels, and 61.16% lack public whistleblowing channels. Only 14.16% of universities publicize whistleblowing channels through dedicated columns or websites. Appointing dedicated staff and publicizing contact and whistleblowing channels facilitate timely handling of research misconduct cases and contribute to the timeliness and targeted nature of research integrity work. This lack of transparency hampers effective handling of misconduct, undermines credibility, and leaves potential whistleblowers in the dark. Relying on inexperienced, part-time staff could lead to inefficiency, unclear goals, and mishandling of cases.

Fourth, the majority of universities neglect to publish annual reports. These reports serve as summaries of the prior year's activities, allowing universities to learn from past experiences, identify best practices, and enhance operational efficiency. The timely release of such reports would enable better oversight and shared learning between managing bodies and other educational institutions. According to the statistics, less than 40% of Chinese universities with medical programs publish annual reports, with some failing to update them regularly. The absence of the reports hinders the identification of issues and deficiencies in research integrity work, preventing effective adjustments and impeding overall progress due to the lack of effective supervision by managing institutions.

**Recommendations.** In light of the issues identified in the current status of research integrity construction in Chinese universities with medical programs, the following improvement suggestions are proposed.

**Enhancing research integrity website construction.** Websites are platforms for resource sharing and information dissemination. The educational and promotional functions of columns or

thematic websites play a vital role in fostering research integrity in higher education institutions. The promotion and education of research integrity should be internalized as conscious actions within the academic community, with clearer, more detailed, and easily accessible content yielding better results (Griffith, 2013). Our statistical results on the construction of the columns or thematic websites reveal some challenges within Chinese universities with medical programs. These universities should learn from domestic and international experiences, emphasize the construction and maintenance of the columns or thematic websites, develop rich and diverse content with timely updates, promote effective information dissemination, foster a positive online academic atmosphere, and enhance the research integrity awareness of faculty and students.

Many foreign universities and organizations have implemented various promotional and educational initiatives through websites. For example, the University of Cambridge's thematic website includes sections on research integrity, ethics, misconduct, governance, and training courses. It provides a wealth of resources, including research integrity statements and reports, information of research ethics committees, academic research involving personal data, guidance, and so on. The website also discloses whistleblowing channels for research misconduct, allowing anonymous or named reporting of dishonest research-related behavior, crucial for maintaining integrity and preventing improper conduct (University of Cambridge, 2022). Harvard University also places great importance on the construction of thematic websites and has separate pages for teachers and students to strengthen promotion (Cui et al., 2020). The Erasmus University Rotterdam in the Netherlands developed a set of multiple-choice question cards featuring 75 dilemmas in scientific activities (Erasmus University Rotterdam, 2019). Similarly, world-class universities such as the University of Oxford, MIT, and the University of Vienna have established websites, providing access to policies, promotional materials, online courses on good scientific practices, and procedures for investigating research misconduct. The US Office of Research Integrity (ORI) has uploaded two interactive videos on research integrity education, "The Lab" and "The Research Clinic" along with over 10 infographics (The Office of Research Integrity, 2019), and actively promotes these resources on their website.

In China, a small number of universities with medical programs have launched thematic websites dedicated to fostering research integrity among their staff and students, with some doing commendably well in this regard. For example, the website of Beijing University of Posts and Telecommunications provides a wealth of information, including institutional profiles, guidelines, work updates, commendations and sanctions, warning cases, reference materials, acceptance agencies, and partner links. Some information may have indirect, long-term effects, such as warning cases, which serve as a deterrent and raise awareness of the consequences and impacts of research misconduct. Commendations and sanctions can positively reward research integrity, encourage adherence to academic guidelines, and promote the scientific spirit. Other universities should learn from the best practices in website construction, focus on content structure, centralize research integrity-related information in thematic websites, adhere to the principles of regular updates and consistent maintenance, and proactively emphasize the development and upkeep of thematic websites.

**Publicizing research integrity warning cases and exemplary achievements.** Addressing research misconduct is a crucial challenge for emerging countries striving to become scientific powerhouses (Bretag et al., 2014). With Chinese culture deeply valuing integrity, the emphasis on promoting research integrity

becomes even more essential. On the other hand, research misconduct should be penalized and warned against, especially in cases of severe or intentional misconduct. In 2019, the Chinese government report included research integrity for the first time, emphasizing the importance of addressing misconduct (Li, 2019). Every year, the National Natural Science Foundation of China discloses a myriad of research misconduct instances from universities across the country. As mentioned before, showcasing warning cases and exemplary achievements can have profound and lasting impacts that should not be overlooked.

Highlighting warning cases enables educators and students to acknowledge their mistakes, fostering growth and strengthening self-discipline. By analyzing these cases, they can better understand academic ethics, responsible research behavior guidelines, and establish a strong research integrity mindset, thereby increasing compliance and reducing the likelihood of research misconduct. The announcement of exemplary achievements can inspire adherence to academic ethical standards and prompt individuals to emulate positive role models. This guidance fosters a proper research integrity awareness, cultivates scientific morality and responsibility, and positively impacts the development of responsible research behavior habits during learning and research processes. Therefore, Chinese universities with medical programs should prioritize publicizing warning cases and exemplary achievements. By combining warning education and role model education, they can enhance the awareness and importance of research integrity among teachers, students, and researchers, improving their sense of responsibility and compliance, and ultimately reducing research misconduct cases in the learning and research process.

**Establishing dedicated personnel and publicize contact and whistleblowing channels.** The statistics on research integrity agencies and full-time staff indicate that Chinese universities with medical programs must amplify their efforts in appointing dedicated personnel and publicizing contact and whistleblowing channels. Such appointments and channels not only streamline the management of research misconduct cases but also dispel negativity and delayed responses. Furthermore, they ensure that faculty and students have immediate access to consultation, support, and education on research integrity. European institutions, such as the University of Düsseldorf, the University of Copenhagen, the University of Vienna, and Karolinska Institutet, provide exemplary models. They have crafted independent departments or committees, staffing them with 1–2 dedicated staff members. These personnel are responsible for disseminating information, coordinate educational efforts, and manage research misconduct cases (Wang, 2019). Another commendable system is the University of Minnesota's anonymous electronic reporting system (Liu, 2016), designed for ease of reporting and confidentiality.

Based on these experiences, to bolster research integrity initiatives, universities need to refine their strategic planning, assign dedicated staff swiftly, define their exact responsibilities, instate efficient contact and whistleblowing channels, and ensure synchronized communication throughout all departments. This holistic approach will enrich the research integrity services available to faculty, students, and other academic professionals.

**Timely publication of annual research integrity reports.** The annual reports offer a comprehensive assessment and summary of the outcomes from research integrity initiatives. These reports reflect a clear understanding of the real-world application of research integrity, serve as an essential tool for identifying operational trends, and provide foundational guidance for enhancing research integrity in the subsequent year. British

universities place great emphasis on these reporting systems. For example, the University of Cambridge, the University of Hull, and the University of Manchester all summarize cases and propose preventive measures in their reports. In 2022, 65% of British universities published annual reports (Zhao and Zhao, 2022), while less than 40% of Chinese universities with medical programs did so. The statistical data indicate that significant progress is still needed. Universities should learn from British institutions by promptly summarizing and publishing their reports.

Statistical data reveal that 53 Chinese universities last published their reports three years ago. It is crucial for these universities to actively update their information. Furthermore, universities should conduct a comprehensive and systematic review, inspection, analysis, and evaluation of the previous year's research integrity efforts. This process should serve to glean lessons and inform the subsequent year's strategic focus and direction, thereby minimizing detours, enhancing efficiency, and continuously propelling the institution's research integrity development forward. Moreover, the published reports can serve as references for government bodies and other universities for oversight and assessment. Universities should actively seek feedback, identifying both their successes and areas of improvement to bolster overall performance. In conclusion, by earnestly learning from each other's experiences and integrating these insights with their unique circumstances, universities can identify and implement effective operational strategies. Such an approach aids in refining future efforts, optimizing benefits, avoiding pitfalls, and ultimately contributing to the coordinated development of research integrity efforts nationwide.

**Incentive measures.** Implementing strategies to bolster research integrity in Chinese universities presents a multifaceted challenge due to several unavoidable factors. Three major elements stand out: Firstly, the academic cultures and historical backgrounds vary across nations. While openness and transparency might be foundational in some countries' academic culture, adaptation in China might require time. Secondly, resource allocation poses a significant challenge. The construction of dedicated websites, publication of annual reports, etc., require substantial resources, and in the face of limited resources, many universities might prioritize other more pressing needs. Lastly, the inherent inertia in systems cannot be overlooked. Confronted with changes, universities grapple with complexities arising from multiple considerations and the participation of various stakeholders. The combination of these factors leads to a relatively cautious and slow pace in this area in China.

Therefore, fortifying research integrity in Chinese universities is an urgent, complex task that necessitates collective effort. First, policy support should be enhanced. Government management and funding departments such as the Provincial Education Bureau should mandate the publication of relevant information by universities through policy enactment. Policy guidance is crucial since a country's research environment and atmosphere are largely shaped by government policies and measures. Recognizing the importance of research integrity and proactively promoting related policies should be prioritized. For instance, the Provincial Education Bureau and other relevant departments can draw on international experiences to further refine clear guidelines and policies, mandating universities to publish research integrity-related information on their official websites, ensuring proper guidelines for every university. It's important to note that the "Three Implementations, Three Disclosures" issued by the Ministry of Education primarily targets universities under its direct purview, and does not have binding force on universities overseen by provincial educational departments.

Second, supervision needs to be strengthened. Crafting a policy does not mark the end; even well-intentioned policies can stray

off-course during their execution. Thus, regulatory departments like the Ministry of Education need to intensify their supervision of universities, ensuring that each policy is genuinely implemented. The current assessment standards from the Ministry of Education for universities inadequately emphasize the construction of research integrity. Consequently, they do not substantially motivate the development of research integrity in these universities, leading to limited progression in this critical area. This requires genuinely incorporating the construction of research integrity in universities into the assessment scope by supervisory departments. Not only can this ensure that universities comply with guidelines, but it can also provide the government with feedback to further refine related policies.

Third, financial support should be provided. Establishing and maintaining an online platform for research integrity requires continuous financial backing. Although most universities have their own funding sources, to ensure uniformity and efficiency of the platforms, management departments can establish a dedicated fund specifically for supporting and funding the construction of universities' research integrity websites. This fund would comprise both basic and competitive funds. This way, not only can every university maintain its research integrity platform with sufficient funds, but through fund allocation, universities can be encouraged to perform better in the area of research integrity.

In conclusion, strengthening the research integrity construction in Chinese universities is a systemic and comprehensive task, requiring the concerted effort of management departments, funding departments, and universities. Ultimately, it's through steadfast research integrity that the sustainable and thriving growth of Chinese universities in the academic field can be assured.

### Data availability

All data used to support the findings of this study are included in this published article and its Supplementary Information files.

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### Author contributions

The corresponding author made substantial contributions to the conception and design of this work, while the first author was responsible for data collection, statistical analysis, and drafting the article. All authors have revised the manuscript for important intellectual content and have read and agreed to the current version of the manuscript.

### Competing interests

The authors declare no competing interests.

### Ethical approval

This article does not contain any interaction with human participants performed by any of the authors. The data utilized in this study is sourced from publicly accessible online information and does not compromise individual or institutional privacy.

### Informed consent

No human subjects are involved in this study.

### Additional information

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