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Analysis on the Current Situation of Entry of Medical Health Data into Balance Sheet and Discussion on Compliance Problems

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Abstract. From January 1, 2024, China's Ministry of Finance printed and distributed the Provisions on Accounting Treatment Substitutes for Enterprise Data Resources, which provide a basis for the entry of enterprise data assets into the statements. Based on this background, this paper firstly studies the status quo of data assets of listed companies on the pharmaceutical bio-boards of China's Shanghai, Shenzhen and Beijing Stock Exchange, and finds that pharmaceutical bio-enterprises are cautious about data resources and are still in the initial stage. In the 2024 report, the number, amount and the effect on the financial index and the market value of the company are limited. Then, it summarizes the practical difficulties of entering medical health data into the statement and puts forward the compliance challenges, namely, the difficulty in determining the right of assets, the ambiguity of the scope of entering the statement and the standard of value evaluation, the balance between the protection of data privacy and the disclosure of data assets. At the same time, the individual level and the national and government levels of response measures to make thinking and prospects.

Keywords: Data Elements, Health data, Data Teaching, Assets Entry, Compliance

1. Health data assets statement background

1.1. Relevant policy background: market-oriented reform of data elements

A significant policy evolution in China's digital development landscape began around 2020. Central authorities issued multiple documents that explicitly designated data as the fifth factor of production, thereby laying the groundwork for leveraging public data assets and creating a supportive policy environment for their value realization.

In the field of medical and health care, there is a huge amount of data in stock. It is an important link to promote the mining and application of data, especially to combine with the new information technology. The Outline of the "Health China 2030" Plan proposes to strengthen the construction of the application system of big data on health and medical treatment, and promote the opening, sharing, in-depth mining and extensive application of big data on health and medical treatment based on regional population health information platforms [1].

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At the same time, a number of policies have been introduced in the area of health that specifically address data applications. In June 2016, the General Office of the Central People's Government of China (the State Council) issued the Guiding Opinions on Promoting and Regulating the Application and Development of Big Data on Health and Medical Treatment, clearly stating that efforts shall be made to regulate and promote the integration, sharing and open application of big data on health and medical treatment [2]. By November 2022, the National Health Commission of China ("NHC") has issued the 14th Five-Year Plan for the Informatization of Health for All, proposing to improve the resource factor system for big data on health and medical treatment, establish and improve the management system for health and medical treatment data, cultivate the market for health and medical treatment data elements, stimulate the value of data elements, and promote the industrialization and large- scale application of big data on health and medical treatment in disease prevention, health management, auxiliary decision-making, drug research and development, medical insurance, precision medical treatment, nutrition and health, etc. Explore the establishment of a data value assessment system, improve the data value assessment framework, and explore the establishment of a diversified and coordinated big data sharing mechanism for health and medical treatment, including governments, institutions of higher learning, research institutes and enterprises [3].

Health care has become one of the important application scenarios fostered by the data factor market. In January 2024, seventeen departments, including the National Data Administration, affiliated to the National Development and Reform Commission ("NDRC"), promulgated the Three-year Action Plan for "Data Elements ×" (2024-2026), specifying health care as one of the twelve key actions. Data Elements × key medical and health actions include: "enhance the accessibility of medical treatment of the masses, explore and promote the sharing of electronic medical record data, and promote the unification, sharing and mutual recognition of data standards for inspection and testing results among medical institutions. Convenient medical claim settlement, and support medical institutions to carry out diagnosis and treatment before paying for medical treatment based on credit data. Promote convenient medical insurance services. Explore and promote the integrated application of data on medical insurance and commercial health insurance in accordance with laws and regulations, improve insurance services, and promote the coordinated development of basic medical insurance and commercial health insurance. Release the value of health and medical treatment data in an orderly manner, improve personal health data files, integrate data on physical examination, medical consultation, disease control, etc., and innovate the data-driven occupational disease monitoring, early warning of public health events and other public service models. Strengthen the integration and innovation of medical data, support public medical institutions to share data with financial, pension and other business entities under the premise of compliance with laws and regulations, support the accurate design of commercial insurance products, recuperation and recuperation and other service products, and expand the application of new modes and new business types of data such as smart medical care and intelligent health management. Improve the development level of traditional Chinese medicine, strengthen the integration of multi-source data in the whole process of prevention, treatment, rehabilitation and other health services of traditional Chinese medicine, support the systematic analysis of the curative effects, drug interactions, indications, safety and other aspects of traditional Chinese medicine, and promote the high-quality development of traditional Chinese medicine."

In order to implement the aforesaid action plan, all provinces and cities in China have issued corresponding work arrangements, such as the implementation plans for Gansu Province, Sichuan Province and Shandong Province.

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In March 2024, the People's Government of Gansu Province promulgated the Implementation Plan of Gansu Province for the Three-year Action of "Data Elements ×" (2024-2026), putting forward a total of nineteen measures, in terms of data elements × medical treatment and health, to improve the accessibility of the masses to medical treatment, strengthen the rating of the application level of electronic medical records and the evaluation of the interconnection and standardization maturity, and promote the sharing of electronic medical record data. Improve the mechanism for the unification, sharing and mutual recognition of data standards for inspection and testing results, and by relying on the National Health Platform of Gansu Province and the Health Gansu APP, comprehensively promote medical institutions to provide services for the convenience and benefit of the people, such as paying fees between patients, settling accounts at the bedside, and sharing and mutual recognition of inspection and testing results. Facilitate medical claim settlement, support medical institutions to carry out diagnosis and treatment before paying for medical treatment based on credit data, and promote medical insurance services for the convenience of the people. Promote the integration and application of medical insurance and commercial health insurance data, and provide medical services such as "medical insurance + commercial insurance" one-stop "second compensation". Release the value of health and medical treatment data, encourage the relevant entities, medical institutions and third-party entities to integrate the data on physical examination, medical treatment and disease control to innovate public service models, provide real-time authorized inquiry services for personal electronic health files, support the early warning and monitoring of public health incidents, and strengthen digital occupational health regulation and services. Strengthen the integration and innovation of medical data, vigorously develop the medical data service industry by relying on artificial intelligence, machine learning and other technologies, cultivate intelligent medical imaging, intelligent diagnosis and treatment, intelligent health management and other new models and new business forms, support financial and elderly care operators to share medical data, and develop new commercial insurance and recuperation products. Promote the development of TCM, strengthen the integration of multi-source data in the whole process of TCM prevention, treatment, rehabilitation and other health services, support the systematic analysis of TCM efficacy, drug interaction, indications, safety and others, and provide support for industrial policy formulation, enterprise operation, product research and development, etc [4]..

In May 2024, sixteen departments including the Development and Reform Commission of Sichuan Province, the Health Commission of Sichuan Province and the Medical Security Bureau of Sichuan Province jointly printed and distributed the Key Work Plan for "Data Elements ×" in Sichuan Province in 2024. The programme identifies thirty-seven priorities in twelve areas for 2024, which relate to the health sector:

(1) Data Elements × scientific and technological innovation: build a provincial health and medical treatment big data research public service platform, and explore the analysis, exchange and sharing of scientific research data across departments, hospitals and regions. (2) Data Elements × medical health: promote the construction of the provincial public health big data center, explore and promote the sharing of electronic medical record data, and promote the aggregation, governance, openness and application of residents' electronic health files, so as to provide urban and rural residents with all-round and life-cycle digital health management services. Formulate the standards and specifications for the quality control of medical image information in Sichuan Province, and promote the sharing and mutual recognition of inspection results among medical institutions. Explore the establishment of the Sichuan Intelligent Medical Insurance Laboratory (Innovation Empowerment Center), promote the data transmission and insurance of medical insurance, explore

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the interconnection of medical insurance and commercial insurance data, and ultimately achieve one-stop settlement of medical insurance and commercial insurance compensation, so as to avoid the insured from running back and forth or running at both ends. Construct the data closed-loop of "hospital - community - family" for patients, improve the data collection and update mechanism of TCM medical institutions, establish a visual image of patient health, and create three to five intelligent service scenarios for patient data supported by data and models [5].

In June 2024, Ge Yugui, a second-class inspector of the Shandong Provincial Health Commission, introduced that the Provincial Health Commission has formulated and issued a three-year action plan for "data elements × medical health", which further stimulates the potential of data elements and promotes the digital transformation and innovative development of the health cause in Shandong Province in terms of improving the convenience of the masses in medical treatment, strengthening the integration and application of data, establishing a new paradigm for medical research and promoting the circulation of data elements [6].

On May 24, 2024, at the 7th Digital China Summit, the State Data Administration, in concert with several departments, released the first batch of twenty typical cases of "Data Elements ×", covering twelve industries and fields. Among them, the Intelligent Medical Data Analysis Assistance System of Xuanfei Medical and the high-quality drug data set of Beijing Computing Center, as the representatives of the medical and health field, were selected as the first batch of cases, demonstrating typical experience for the value mining of data elements in the medical and health field [7,8].

Thus, from a macro perspective, data assets into the statement is to achieve the basic work of data elements, is to promote enterprise digital transformation and digital economic development. From the microscopic point of view, data assets can increase the scale of enterprise assets, optimize the financial structure, and promote data flow and transactions, and create more business opportunities.

1.2. Interpretation of the interim provisions on accounting treatment for enterprise data resources

In this context, in August 2023, China's Ministry of Finance officially promulgated the Interim Provisions on Accounting Treatment for Enterprise Data Resources (hereinafter referred to as the "Interim Provisions"), which became into force as of January 1, 2024, specifying the accounting treatment methods for data resources.

The entry of data assets into the balance sheet is a form of accounting and information disclosure in which data resources are regarded as assets, that is, they are regarded as "assets" in the balance sheet to reflect their real value and business contribution. The main contents of the Interim Provisions shall include (see Figure 1 for details):

1. Scope of application: accounting treatment methods for data resources involving intangible assets, inventories and other categories that comply with the Accounting Standards for Business Enterprises, and data resources that do not meet the conditions for recognition of assets.

2. Applicable standards: An enterprise shall, according to the form of data resources, business mode and holding purpose, judge and select the application of intangible assets or inventory standards, and comply with the corresponding accounting treatment standards.

3. Listing requirements: add the item of "data resources" under the item of "inventory", "intangible assets" and "development expenses" for classified display.

4. Disclosure requirements: where an enterprise makes an assessment of data resources and the assessment results have a significant impact on the financial statements of the enterprise, it shall disclose the information sources on which the assessment is based, the assumptions and restrictions

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for the establishment of the assessment conclusion, the selection of assessment methods, the source, analysis, comparison and calculation process of each important parameter and other information.

5. The Interim Provisions adopt a prospective application, taking effect on January 1, 2024. Consequently, expenditures related to data resources that were already expensed and recorded in the profit and loss prior to this date are not subject to adjustment.

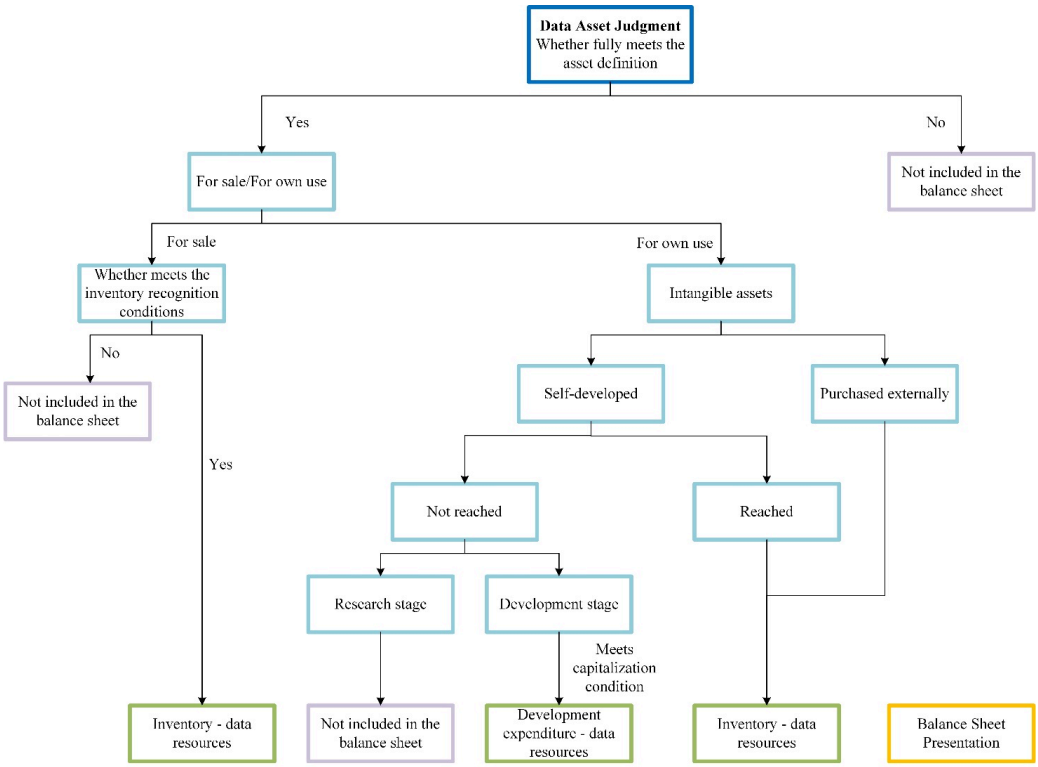

Figure 1. Illustrations of interim provisions

According to the Opinions on Building a Data Base System to Better Give Play to the Role of Data Elements (hereinafter referred to as the "Data Article 20") issued by the Central People's Government of China in December 2022, data may be divided into three types, namely, public data, enterprise data and personal data, based on the data subjects, and the "Division of Three Rights" system based on the classification and hierarchical authorization of these three types of data shall be established to explore ways for individuals, enterprises and public data to share value and benefits.

In the field of health care, a large part of China's data creation scenario is located in public medical institutions. In the process of data generation, enterprises provide technical support for clinical research, and patients provide information related to personal health. Therefore, under the data classification framework of public data, enterprise data and personal data, it can be considered that data in public medical institutions includes both public data and enterprise data and personal data.

However, as public medical institutions follow the government accounting system, they are not applicable to the Interim Provisions and cannot reflect the value attribute of the data they possess in accounting. At present, public medical institutions treat medical and health data only at the level of maintaining normal operation, and are less enthusiastic about the processing, utilization, sharing and circulation of medical data. Therefore, public medical institutions do not have the basis for the corresponding data assets to be "entered into the statements". Therefore, this paper makes a

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statistical analysis of the data entered into the statements of biological and pharmaceutical enterprises for the time being, and see Part II of this article for details.

Some scholars point out that in the process of data registration, public medical institutions mainly involve such steps as data inventory, confirmation of rights, asset confirmation, cost measurement and disclosure [9]. So under the framework of the current "Division of Three Rights", public medical institutions, as the main body of medical data generation and management, assume the responsibility of data holding and control. This means that medical institutions shall not only have certain management authority over data resources, but also ensure that the authorization process complies with laws and regulations in value-added operations (such as processing and commercial application) after data entry into the balance sheet. Specifically, the subsequent use of each item of data shall be explicitly authorized by the source of the relevant data item by item to ensure that the rights and interests of all parties are protected and avoid potential conflicts of rights and interests.

In addition, in order to promote the efficient use of medical data assets, exploring the establishment of "common benefit" model is particularly important. By rationally distributing the revenue ratio between users and data producers, we can not only improve the efficiency of data utilization, but also create a benign mechanism for multi-party cooperation. This model can further release the potential value of data elements while ensuring the legitimacy of data sources.

2. Entry of data assets of listed companies on the pharmaceutical and biological board

2.1. Tabulated overview

According to the financial data of the annual report for 2024 disclosed by listed companies, by June 22, 2025, China's Shanghai Stock Exchange, Shenzhen Stock Exchange and Beijing Stock Exchange have five hundred and twenty-four listed companies classified as "medical care" and "drug retail" in the financial terminal database of Wande (Wind). Only seven listed companies on the pharmaceutical and biological board have disclosed the relevant matters concerning data resources in the statements. Among them, one listed company, Meinian Onehealth Healthcare Holdings Co., Ltd.(hereinafter referred to as "Meinian Onehealth"), has continuously disclosed data resources in its financial statements for the previous three quarters. Among them, Sichuan Hezong Medicine Easy-to-buy Pharmaceutical Co., Ltd.(hereinafter referred to as "Easy-to-buy") and BGI Genomics Co., Ltd. (hereinafter referred to as "BGI") have made detailed explanations on the data resources in the semi-annual financial statements.

In the first quarter of 2024, Meinian Onehealth listed company disclosed "data resources" in its financial statements, with a total net book value of more than RMB545 million; in the first half of 2024, Meinian Onehealth, Easy-to-buy, Shouyao Holdings (Beijing) Co., Ltd. (hereinafter referred to as "Shouya") three listed companies disclosed "data resources" in their financial statements, with a total net book value of more than RMB961 million; and in the third quarter of 2024, Meinian Onehealth, Easy-to-buy, Shouyao and BGI four listed companies disclosed "data resources" in their financial statements, with a total net book value of more than RMB17.55 million. In 2024, seven listed companies disclosed "data resources" in their financial statements, and the net book value of data resources reached RMB5,578 million.

As shown in Table 1, seven listed companies in the pharmaceutical and biological sector have reported enterprise data resources on their financial statements. The current scale and prevalence of this practice, however, suggest that the recognition of data resources among these firms is still in its early stages.

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Table 1. List of listed biomedical companies with data resources in the table

Name of securities	Jointown Pharmaceutical Group Co., Ltd. (“Jointown”)	Easy-to-buy	BGI	Meinian Onehealth	Guangzhou Kingmed Diagnostics Group Co., Ltd. (“Guangzhou Kingmed”)	JZJ Chain Drugstore Corporation (“JZJ”)	Shouyao
Market Value (as of August 19, 2025)	253.64	25.45	199.45	191.41	124.85	31.85	51.99
Total revenue for the first quarter of 2024	404.72	12.37	8.21	18.01	18.41	23.14	/
Total assets 2024 First quarter	972.41	19.38	134.57	185.19	116.02	100.56	10.66
Total data resources in the statement	/	/	/	RMB5,459,823.10 (development expenditures only)	/	/	/
Proportion of data assets to total assets	/	/	/	0.03%	/	/	/
Statement entry	/	/	/	Inventory, intangible assets, development expenses	/	/	/
Total income 2024 semiannual	771.71	22.25	18.71	42.05	38.81	44.86	0.038
Total assets 2024 semiannual	987.05	16.8	133.81	186.04	113.02	103.67	10.28

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Table 1. (continued)

Total data resources in the statement (yuan)	/	RMB1,838,457.86 (Intangible Assets) + RMB100,972.13 (Development Expenditure)	/	RMB7,519,758	/	/	RMB155,028.84
Proportion of data assets to total assets	/	0.12%	/	0.04%	/	/	0.02%
Statement entry	/	Intangible assets, development expenses	/	Development expenditure	/	/	Intangible assets
Total income January to September 2024	1134.29	32.35	28.26	71.4	56.19	67.35	0.038
Total assets 2024 Third quarter	1010.17	16.95	132.84	190.15	109.78	107.06	9.85
Total data resources in the statement	/	RMB1,778,988.96 (Intangible Assets) + RMB224,976.62 (Development Expenditure)	RMB 3,128,901.55 (Intangible Assets) + RMB3,128,552.12 (Development Expenditure)	RMB9,143,145	/	/	RMB146,084.88
Proportion of data assets to total assets	/	0.12%	0.05%	0.05%	/	/	0.01%
Statement entry	/	Intangible assets, development expenses	Intangible assets, development expenses	Development expenditure	/	/	Intangible assets
Total income from January to December 2024	1,518.10	43.81	38.66	107.02	71.90	92.83	0.04

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Table 1. (continued)

Total assets 2024	598.89	17.17	125.43	201.27	103.92	106.23	9.22
Total data resources in the statement	RMB14,614,070.05	RMB9,692,066.02 (Inventory) + RMB2,047,230.19 (Intangible assets)	RMB3,502,655.61 (intangible assets) + 6,119,015.36 (Development expenses)	RMB8,819,943.16 (Intangible assets) + RMB532,075.47 (Development expenditure)	RMB3,653,847.59 (Intangible assets) + RMB3,354,408.43 (development expenses)	RMB5,449,659.76	/
Proportion of data assets to total assets	0.02%	0.68%	0.08%	0.05%	0.07%	0.05%	/
Statement entry	Intangible assets	Intangible assets, inventories	Intangible assets, development expenses	Intangible assets, development expenses	Intangible assets, development expenses	Development expenditure	/

Source: Corporate earnings, Wind.

Note: except specified in the Table 1, the currency unit shall be RMB 100 million.

2.2. Statement entry analysis

In terms of enterprise scale, the activity of data resource capitalization in 2024 is concentrated within companies valued under RMB 20 billion, which constitute 60% of the cases recorded by June 22, 2025.

In terms of regional location, seven listed companies with data assets disclosed in the 2024 quarterly and annual financial statements are located in seven provinces and municipalities directly under the Central Government, one in East China, one in North China, one in Central China and one in Southwest China. The total amount of data assets involved in Kyushu Link, located in central China, is about RMB14 million.

An analysis of the actual controller attributes reveals that six of the seven listed companies which disclosed data assets in their 2024 financial reports are private enterprises, a dominance reflected in both the firm count and the capitalized amounts.

The audit work for these companies is conducted by five accounting firms. The cohort comprises Tianjian Accounting Firm Zhejiang Orient Ltd., Zhongshen Zhonghuan, Ernst & Young Huaming, BDO China Shu Lun Pan, and Shinewing, among others.

2.3. Current data resources entry account distribution

Among the listed companies that disclose data resources in the statement in 2024, one company, Jointown listed the data resources under the item of intangible assets, and one company, JZJ listed the data resources under the item of development expenditure. BGI, Meinian Onehealth and Guangzhou Kingmed listed the data resources under the intangible assets and development expenditure simultaneously, and one company listed the data resources under the intangible assets and inventory simultaneously.

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In terms of amounts, about 57.65% of the disclosed data resources are concentrated in intangible assets, about 27.66% in development expenditure and about 17.37% in inventory.

The data resources recognized as intangible assets by five listed companies amounted to a total of approximately RMB 23.97 million. As detailed in Table 2, the proportions of these resources within their total intangible assets vary significantly: they constitute 100% for Jointown and Shouyao, over 4% for Easy-to-buy, and less than 1% for BGI.

Table 2. Intangible assets of data resources enterprise

Name of securities	Intangible assets-amount of data resources (RMB)	Proportion of data resources in total intangible assets	Total amount of data resources included in the financial statements of the enterprise (RMB)
Jointown	14,614,070.05	100%	14,614,070.05
Guangzhou Kingmed	3,653,847.59	2.18%	7,008,256.02
BGI	3,502,655.61	0.97%	9,621,670.97
Easy-to-buy	2,047,230.19	4.30%	11,739,296.21
Shouyao	155,047.84	100%	301,132.72

Source: Corporate earnings, Wind.

Four listed companies recognized their data resources as development expenditure, with a total capitalized amount of RMB 25.577 million. Their respective proportions, detailed in Table 3, vary considerably: while JZJ and Guangzhou Kingmed attributed 100% of their development expenditure to data resources, the figure stood at over 40% for Meinian Onehealth and below 5% for BGI.

Table 3. Data resources into development expenditure item enterprise

Name of securities	Development expenditure-amount of data resources (RMB)	Proportion of data resources in total development expenditure	Total amount of data resources included in the financial statements of the enterprise (RMB)
BGI	6,119,015.36	4.11%	9,621,670.97
JZJ	5,449,659.76	100%	5,449,659.76
Guangzhou Kingmed	3,354,408.43	100%	7,008,256.02
Meinian Onehealth	532,075.47	46%	9,352,018.63

Source: Corporate earnings, Wind.

2.4. The influence of data resource entry on financial index and market value

An analysis of the seven enterprises reveals zero opening balances in their data resource accounts, confirming that these are newly recognized assets under the New Accounting Standards. To assess the impact, a scenario was modeled wherein these resources were fully expensed instead of capitalized. The results, detailed in Table 4, indicate that capitalization increased the net profit margin by approximately 0.1% for four enterprises when benchmarked against the hypothetical expense scenario.

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Table 4. Impact of data asset entry on zero opening balance of data resources

Name of securities	Asset-liability ratio	If the data resources are not included in the balance sheet, the asset-liability ratio (estimated)	Decrease in asset-liability ratio after data resources are entered into statement	Profit margin	If data resources are not included in the profit margin of the statement (estimate)	Increase in profit margin after data resources are included in statements
Meinian Onehealth	56.19%	56.21%	0.02%	-17.17%	-17.47%	0.30%
BGI	24.94%	24.95%	0.01%	-4.39%	-4.62%	0.22%
Easy-to-buy	49.71%	49.77%	0.06%	0.45%	0.36%	0.09%
Shouyao	10.70%	10.70%	0.00%	-2706.65%	-2710.73%	4.08%
Guangzhou Kingmed	28.07%	28.09%	0.02%	-5.77%	-5.87%	0.10%
JZJ	73.83%	73.86%	0.04%	1.38%	1.32%	0.06%
Jointown	67.19%	67.20%	0.01%	1.84%	1.83%	0.01%

Source: Corporate earnings, Wind.

Having analyzed the impact of data assets on key financial ratios, this study pursues this inquiry by examining their potential effect on corporate market value. However, several constraints—such as the unaudited nature of quarterly reports in the pharmaceutical and biological sectors, the limited sample size of firms capitalizing data assets, and the multitude of factors influencing stock prices—make it difficult to establish a direct causal link. Consequently, this paper adopts an indirect metric: it assesses the value implication of data assets by correlating the newly recognized asset value with the company's price-to-book ratio (PB).

The theoretical market value increment attributable to the capitalization of data assets, estimated via the PB ratio, exceeds RMB 649.9 million in aggregate for the seven companies (see Table 5). The breakdown reveals that three firms—Meinian Onehealth, BGI, and Guangzhou Kingmed—saw an increase of over RMB 10 million each. Furthermore, for two other enterprises (Easy-to-buy and JZJ), the capitalization contributed to a theoretical market value uplift of more than 0.1%.

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Table 5. Marginal market value impact of resource entry based on PB estimates of listed companies

Name of securities	Total data resources in the statement (yuan)	PB mean before and after entry	Marginal market value impact (yuan)	Ratio of data asset impact market value to total market value
Meinian Onehealth	5,459,823	2.5734	14,050,309	0.07%
BGI	6,257,454	1.7138	10,724,024	0.05%
Easy-to-buy	1,939,430	2.3282	4,515,381	0.23%
Shouyao	155,029	6.3035	977,224	0.02%
Guangzhou Kingmed	7,008,256	1.7137	12,010,381	0.09%
JZJ	5,449,660	1.3351	7,275,963	0.20%
Jointown	14,614,070	1.0558	15,429,645	0.06%

Source: Corporate earnings, Wind.

2.5. Summary

By December 31, 2024, the entry of health data assets into the balance sheet is still in its infancy. In order to realize the comprehensive entry of data assets into the balance sheet, the key links such as confirmation of rights, pricing and amortization shall be completed in a standardized manner, and the financial value of data assets shall be released by not only truly reflecting the data assets held by enterprises, but also by preventing financial fraud and fraud. At present, the successful entry of data assets into the balance sheet of bio-pharmaceutical enterprises, data resources have not yet completed the entry of enterprises to provide a useful model.

According to the current method of entering data assets into the balance sheet, the biopharmaceutical enterprises have not formed a unified standard in the process of completing the entry of data assets into the balance sheet, and mainly have the following directions: (1) some companies have made a detailed classification of the assets of data resources, analyzed the cost composition, amortization period and method design, and finally completed the listing and disclosure of data assets; (2) some companies, based on the project system, have included the capitalizable research and development expenses in the data resources item; and (3) some companies have separated the capitalized research and development expenses from the intangible assets and separately presented them as the data resources item. These different methods provide a reference and inspiration for the uncompleted bio-pharmaceutical enterprises.

The capitalization of data assets delivers multi-dimensional value to biomedical enterprises and the broader macro-economy. Financially, it expands asset scales, lowers leverage ratios, and enhances profitability, thereby strengthening key financial indicators. In terms of market valuation, while the direct impact on financial ratios may be modest, theoretical estimates suggest it can unlock hundreds of millions in market value for certain firms. From a financing perspective, making data value explicit provides a clear basis for investors, enabling asset activation, broadening financing channels through methods like data pledge financing and securitization, and fostering business transformation. Operationally, the capitalization process compels enterprises to establish more refined internal management protocols, clarifying the composition and value realization paths of data resources. Finally, on a societal level, it stimulates the development of related industries (e.g.,

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data cleaning, labeling, assessment) and contributes to building a robust platform for the sustainable development of the data economy.

3. Operational difficulties and compliance challenges

Although data assets can bring a lot of benefits to bio-pharmaceutical enterprises and the macro-economy, it is still a challenge to realize the full entry of health data assets and the release of their financial value. At present, the number of biopharmaceutical enterprises completing the entry of data assets into balance sheet is relatively small, and the scale of the entry is relatively limited. Whether the Interim Provisions can effectively promote biomedical enterprises to mine the potential value of data assets, activate assets and realize the value of data elements still needs further practice and verification. On the whole, it is a long-term effort to promote the data assets entry and its market-oriented recognition at the social level.

3.1. Difficulty in ascertaining rights to health data assets

The confirmation of data right is an indispensable link in the process of entering data assets into the balance sheet. However, due to the complexity of medical health data sources, including patient information, medical records, image data and scientific research data, the ownership relationship often involves multiple subjects, such as patients, medical institutions, scientific research institutions and third-party institutions, which makes the determination of data rights more complicated. The Data Article 20 stipulates that, when entering data assets into the balance sheet, an enterprise shall establish a property right division mechanism to clearly divide the right to use and the right to operate data assets, so as to ensure the credibility of the right confirmation.

There are two aspects that are particularly critical in determining the right:

The first is the definition of ownership. Patients have the fundamental right to their personal health information, but medical institutions also need to collect and use such information in order to provide diagnosis and treatment services; in addition, scientific research institutions and enterprises often need to use data resources from patients and medical institutions when carrying out clinical research. How to distribute the ownership of data reasonably and evade the possible conflicts of interest and ownership disputes is one of the biggest challenges in the confirmation of data assets.

Next is the use right and the management right distribution. Medical institutions, researchers, government departments and commercial institutions all have practical needs for medical and health data. On the premise of ensuring data security and privacy, it is another difficult problem to distribute these rights reasonably, establish balance mechanism after decentralization and maximize data value.

3.2. The range and valuation criteria of medical and health data assets in balance sheet

At the level of data collection and statistics, the definition and quantification standards of health data assets are not uniform at present, and different industries and institutions have different understanding of data types, which has brought considerable obstacles to the entry of data assets into the balance sheet. Health data are often scattered in different medical institutions and information systems. Due to historical problems, data collection does not fully follow the latest standards, leading to data integration difficult. In addition, due to the restrictions of management regulations and safety requirements, the degree of data sharing is generally low.

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At the accounting level, there are still many difficulties in the valuation, amortization and cost collection of data assets. The Interim Provisions clearly require that the cost or value of data assets must be accurately measured. However, there are many links in the process of data assets generation, each link will have different costs, which brings great complexity to cost accumulation and amortization. Although the "Interim Provisions" provides a reference to inventory assets and intangible assets accounting guidelines for guidance, but in practice, the bio-pharmaceutical enterprises still face many problems. For example, how to accurately differentiate the value of medical and health data assets at the development stage from that at the research stage, whether the amortization plan of data assets after the active period needs to be adjusted, and whether an external audit mechanism can be introduced to support the depreciation processing are practical issues to be solved.

In addition, due to the intangible, replicable and dependent nature of medical data assets, their valuation is often accompanied by greater uncertainty, which easily leads to high asset pricing, or even deviate from the true value. The generation of health data assets depends on different scenarios. In the case of drug quality standards, for example, there are several sets of national standards, which are developed and issued by different national authorities, and several standards for occupational classification. But facing different business and management objectives, different classification methods and coding algorithms will be formed for the same kind of drug data. Therefore, it is urgent to establish a scientific and perfect evaluation system.

3.3. Balance between data privacy protection and data asset disclosure

At present, there is no special legislation on the protection of personal health and medical information in China, and the protection requirements for personal information in the medical field are scattered in laws, ministerial/local regulations and ministerial/local rules. Although there are programmatic provisions on the protection of patient privacy, there is still a lack of detailed guidance in the implementation level. Under the current regulatory framework, the data processed by the biomedical industry not only involves the personal information and sensitive personal information in the Personal Information Protection Law, but also may involve the human genetic resources related to the Administrative Regulations on Human Genetic Resources, and the clinical trial data related to the Good Clinical Practice for Drug Trials. When processing such data, comprehensive protection of personal privacy shall be made by reference to the original corresponding requirements while complying with the Law on the Protection of Personal Information.

At the present stage, China has the most compliance requirements for the use/utilization of data in the field of health care, and the management of human genetic data is the most sensitive and meticulous. However, the destruction and deletion of health and medical data are rarely mentioned in most data processing, probably due to the value of health and medical data and the requirement of retention time.

We understand that there are few provisions for health care data in the destruction and deletion phases, given that it is difficult to withdraw informed consent in a timely manner during implementation. For example, during new crown outbreaks, agencies use health codes as an important tool for epidemic control. The main function of health codes is to control the epidemic, but their real-time collection, multi-platform transmission and authentication may also pose a potential threat to citizens' data privacy and security. At the same time, health data can be recovered even if it is de-identified. In the case of electronic medical records, although medical institutions or biomedical enterprises may delete data explicitly associated with patient/resident identity, thereby

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decoupling medical data from personal identity, electronic medical records, as electronic health records throughout the life cycle of an individual, may still be re-identified through public resources after being "de-identified."

The listing and disclosure of data assets in biopharmaceutical enterprises are closely related to data circulation transactions and the development of digital economy. There is a certain antagonism between the two. Data flow transactions require not only the protection of the data content itself, but also the compliance of the way in which data is obtained. However, if patients choose to exercise the right to be forgotten and demand the deletion or decoupling of the data related to them, this will hinder the data circulation and transaction mode of biomedical enterprises, and restrict the free transfer of data and the lawful access of data by others. Therefore, the game of rights and interests between data privacy protection and data asset disclosure will continue to exist with the acceleration of data entry process.

4. Response recommendations

4.1. Enterprise level

Firstly, biomedical enterprises shall build a clear and intuitive data asset management platform, for example, when providing standardized API data services, they may, based on the unified data interface specifications, quickly retrieve the required data and materials, and reasonably collect the use costs of APIs in combination with the predetermined revenue distribution ratio. This method not only improves the efficiency of data management, but also provides strong support for data assets entering into the statement.

Secondly, biopharmaceutical enterprises need to establish a sound data asset management system to ensure compliance and right management to meet the requirements. Therefore, an enterprise shall optimize the existing internal control mechanism, cost collection mechanism and cost allocation mechanism, etc., comprehensively sort out the financial system, work process, division of duties and normative requirements, and build a financial accounting system that matches the needs of entering data assets into the statements. This not only contributes to the refinement of data asset management, but also lays a solid foundation for subsequent financial disclosure.

In addition, accurate assessment of the life cycle and market value of data assets is of great significance to improve the efficiency and economic benefits of data assets. During the assessment process, biomedical enterprises need to comprehensively consider various factors, including the stickiness of medical institutions, patients, drug retail institutions and other entities, the degree of data activity, market value, data application scenarios, policies and regulations, and enterprise development strategies. For data assets in the active period of value, the straight- line method can be used for cost amortization, while after the active period, more flexible amortization strategies such as the double declining balance method or the sum-of-the-years' digits method can be selected for more fully utilizing data assets. This approach can help enterprises maximize the potential value of data assets. For example, Shandong Province has, by holding the "Training on Data Value and Data Assets Entry", invited relevant personnel of state-owned enterprises, private enterprises, public institutions, law firms and asset appraisal institutions to give lectures, widely promoted the concept of data assets entry into the balance sheet, and helped enterprises train accounting talents at the same time, so as to provide support for the reasonable use of data assets [10].

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4.2. National and governmental level

At the level of legislation and policy making, although the policy system including the Twenty Data Rules has been established, in practice, especially in the field of health care data, there is still a blank area in laws and regulations. Therefore, the relevant laws and regulations should be further improved to form a full life cycle closed loop of health data management. On the one hand, it is necessary to accelerate the legislation at the national level and promulgate specific implementing rules for the confirmation of rights to medical and health data, data pricing and data trading, so as to specify the rights and responsibilities of all parties concerned and ensure that laws can be complied with; on the other hand, the government should work with law firms, accounting firms, tax authorities and other institutions to collect more successful cases. Through organizing special seminars, we shall summarize the practical operational experience in respect of compliance, right confirmation, measurement, presentation, disclosure and amortization costs of data assets, and compose guidance documents to help biological and pharmaceutical enterprises better carry out data asset management, so as to promote the circulation and utilization of medical and health data assets within the whole society.

At the policy-making level, government departments should play a coordinating role to promote data sharing among public medical institutions. Develop unified catalog preparation, data interface specifications and application standards to ensure the credibility and mutual recognition of data. At the same time, medical institutions should break departmental barriers, promote the collaboration between the data department and the financial department, and form the overall force of data entry. In addition, promote the circulation and value development of medical data through platforms such as data exchanges and financial institutions. For example, mechanisms combining free use in the public service and paid use by industry enterprises. Meanwhile, we should strengthen the deep integration of medical data with data in other fields such as finance and housing, develop innovative models such as intelligent pension and credit medical care, so as to realize the efficient circulation of medical data at the social level, fully release the value of medical data and inject new impetus into the construction of “Healthy China”.

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