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中國內地與香港 醫藥行業發展前瞻

Future Prospects of Healthcare Industry
in Mainland China and Hong Kong



海通國際與香港貿發局
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PRESENTATION ON JOINT RESEARCH REPORT ON
“FUTURE PROSPECTS OF HEALTHCARE INDUSTRY IN MAINLAND
CHINA AND HONG KONG” BY HAITONG INTERNATIONAL AND HKTDC.

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Abstract

This report reviews the demand and policy background of China's pharmaceutical sector in the past decade, as well as the status of its segments and delves into certain fields of China's pharmaceutical sector. On this basis, this report looks into the development prospects and business model of each segment of China's pharmaceutical sector, and digs into the investment logic and focuses of concern of each segment, including innovative drugs and medical device-related hard technology with innovation drive as the focus, consumer medical care, medical service and traditional Chinese medicine ("TCM") industry with brand drive as the core mode, and CXO industry benefiting from the development of the pharmaceutical sector. Based on the long-term tracking, research and market study of the relevant areas of the pharmaceutical sector, the report intends to foresee the future development opportunities and long-term trends of the pharmaceutical sector and provide some reference to relevant stakeholders.

In retrospect, the pharmaceutical sector of China has two core backgrounds in the past decade. First, the aging of population leads to an increasing demand of medical resources. The increasing burden of chronic disease and lifestyle-related disease will cause stronger demands and higher medical and healthcare expense. **Second, the policy focuses on a core point in the past decade, which is to expand the accessibility of medical resources.** From the 'New Medical Reform' in 2009, to the 'Drug Administration Reform' in 2015 and to the 'Medical Insurance Reform' in 2018, China's insufficient, uneven and inferior medical resources problem has greatly alleviated. This also led to the upgrading of the industry structure and brought new market growth points. While encouraging the technological innovation and development of the pharmaceutical sector during this period, the state also standardized the pharmaceutical sector across the board. The medical reform has promoted the accumulation of long-term development momentum of the industry.

Looking forward to the next decade, two major factors, namely technological innovation and sustainable brand development, drive the growth of the pharmaceutical sector. Technological innovation stems from the long-term accumulation of technological advantages and high R&D investment. Continuous technological innovation drives the market to produce innovative products that meet clinical needs constantly, driving the development of the industries of innovative drug and medical device. The decreasing technology gap between global and Chinese pharmaceuticals and the increasing clarity of payer-side rules such as medical insurance negotiations will also help companies launch more new varieties to market, driving sales growth of key drug varieties and facilitating innovative drug companies to go global. In the medical device industry, domestic enterprises have experienced development from agency to originality, from low-end to high-end, from home to abroad. The medical device-related hard technology continues to be active, with technological innovation products constantly available on the market, highlighting the globalization opportunities for domestic medical device products.

The consumer medical care, medical services and TCM fields have the sustainable brand value. Consumer medical care: with the economic development, China is still under consumption upgrade stage. Coupled with the large population base and the floating consumption habits, the segment with strong consumer attributes can benefit. Medical services: China guides to support the provision of medical care services by social investors, which can promote the development of terminal private medical services and influence the business model of the relevant market segments as well as the

direction of development of corporate brands. Chinese medicine sector: with a long history, a solid mass base, strong support from national policies such as medical insurance and other factors, it can help the sustainable value enhancement of Chinese medicine resource products, sales of branded OTC drugs (over the counter branded drugs) and new channel expansion, as well as the progress of research and development of Chinese medicine innovative drugs.

The CXO industry benefits from China's human resource advantages. Coupled with the expanding demand of pharmaceutical R&D outsourcing services, the next generation of cell and gene therapy CDMOs (Contract Development and Manufacturing Organization) has opportunities. The offshore outsourcing trend of overseas pharmaceutical companies remains unabated. In terms of the industry performance from 2020, overseas clinical Contract Research Organization (CRO) has been greatly affected by the COVID-19 epidemic and the clinical CRO business has generally declined. Offshore outsourcing of overseas pharmaceutical companies is still the main driving force for the revenue growth of domestic CXO companies. In the process of combining imitation with innovation, and then to original innovation, domestic pharmaceutical enterprises need to utilize CXO's advantages in cost reduction, efficiency and quality enhancement for R&D and production. As the impact of the COVID-19 epidemic gradually recedes and conventional business returns to normal, it will facilitate the improvement of CXO companies with a well-established end-to-end global business platform, companies with strengths in niche areas, and companies whose customer business structure continues.

This report is co-prepared by Haitong International Securities Group Limited (HTI) and Hong Kong Trade Development Council (HKTDC). The report also has an in-depth study on the complementary advantages of Hong Kong's pharmaceutical sector and the mainland's, hoping to provide an enlightenment to the development of the pharmaceutical industries for the mainland and Hong Kong. The pharmaceutical sector in mainland is at the stage of accelerating technological innovation and promoting the growth of the export business of mainland pharmaceutical products. Hong Kong has outstanding advantages in new drug launches, facilitated financing and industrial encouraging policies: 1) Hong Kong imports overseas advanced technology and pharmaceutical products faster than the mainland; 2) it gathers international capital, which makes it easier for mainland pharmaceutical companies to secure financing; 3) clinical trials in Hong Kong are internationally recognized, helping accelerate the export of domestic products. **Therefore, Hong Kong is expected to become the trade platform of Asia's pharmaceutical sector due to its special status.**

This report is completed in October 2022.

Definitions

- 2009 New Medical Reform: on March 17, 2009, the Central Committee of the Communist Party of China and the State Council announced the Opinions on Deepening the Reform of the Medical and Health System.
- 2015 Drug Administration Reform: on August 18, 2015, the State Council issued the Opinions on Reforming the Drug and Medical Device Review and Approval System (GF [2015] No. 44).
- 2018 Health Insurance Reform: In 2018, the National Healthcare Security Administration was established to implement health insurance drug reform and provide people with better, fairer and more effective drug coverage through a series of initiatives such as promoting national centralized procurement of drugs and optimizing the national health insurance drug catalog.
- Medical insurance negotiation: the national healthcare security department negotiates with pharmaceutical R&D and production enterprises on drug prices to promote the entry of new listed drugs with high clinical value or already listed drugs (mainly exclusive varieties of innovative drugs or new indications) into the medical insurance catalog to better meet patients' drug needs and reduce residents' drug burden.
- Collective procurement: centralized volume-based procurement of drugs and medical consumables.
- Dual Invoicing System: according to the Circular on Issuing the Implementing Opinions on Carrying out the Dual Invoicing System for Drug Procurement among Public Medical Institutions (for Trial Implementation) (GYGBF [2016] No.4) jointly issued by eight departments including the Medical Reform Office of the State Council, the National Health and Family Planning Commission, China Food and Drug Administration, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Commerce, the State Taxation Administration and the State Administration of Traditional Chinese Medicine on December 26, 2016, invoices are issued by drug manufacturers to drug distributors on a once-off basis while invoices are issued by drug distributors to medical institutions on a once-off basis, which is known as the "Dual Invoicing" instead of the past seven or eight times of invoicing, to reduce the layers of exploitation of the distribution chain and first-class distributors of each variety shall not exceed 2.
- GMP: Good Manufacturing Practice of Medical Products, which is the basic guideline of drug production and quality management.
- Branded OTC drugs: Over the Counter branded drugs.
- CT: A short name of Computed Tomography.
- MRI: a short name of Magnetic Resonance Imaging.
- CXO: a short name of Contract X Organization, mainly covering pharmaceutical R&D production outsourcing services, including CRO, CMO, CDMO, etc.
- CRO: a short name of Contract Research Organization, which mainly provides drug discovery, preclinical research, clinical trials and other new drug R&D contract research services in the drug R&D process.

- CMO: a short name of Contract Manufacturing Organization, primarily providing customized manufacturing services for pharmaceutical products on a large scale in the process of drug R&D and production.
- CDMO: a short name of Contract Development and Manufacturing Organization, which primarily provides pharmaceuticals in the process of drug R&D and production, especially innovative process development and preparation, process optimization, ramp-up, registration and validation of batch production, commercialization production and other customized R&D and production services.

Section I.

Review of the Past Decade



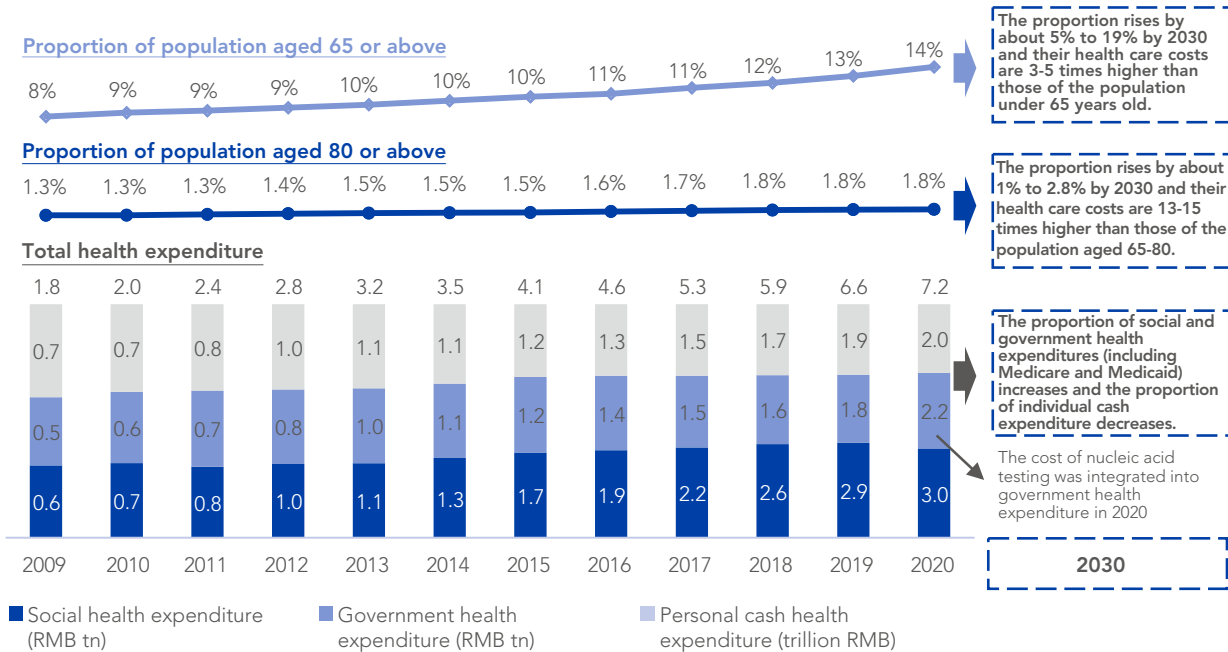
I. Review of the past decade

1.1 Background of the pharmaceutical sector development

1.1.1 Demand background: aging population deepening and medical and healthcare expenses increased, focusing on the role of the increased burden of age and lifestyle-related diseases in driving up healthcare expenses

From 2010 to 2020, the proportion of China’s population over 65 years old and 80 years old increased by 5% and 0.5% respectively, driving a rapid growth in total health care expenditure. According to World Bank population estimate, the proportion of China’s population over 60 is expected to continue to rise by 5% to 19% by 2030, and that of people over 80 will rise by about 1% to 2.8%. In terms of medical expense, from 2010 to 2020, the proportion of government and social health expenditures increased significantly, while the proportion of personal cash expenditures decreased, indicating that the proportion of medical insurance (the lion’s share of social health expenditures) and medical insurance subsidies (which belong to government health expenditures) increased. According to the General Research Report on National Strategy on Coping with Population Aging published by the General Office of the China National Committee on Aging, the medical expenses of people over 65 are about 3–5 times those under 65, and those over 80 are about 13–15 times those aged 65–80. It is expected that the deepening of aging population will accelerate the growth of medical and health expenses.

Figure 1 The total medical and health expenses in China continue to expand, and the proportion of medical insurance and medical insurance subsidies is on the increase



Source: Population Estimate and Projections — World Bank, National Bureau of Statistics, National Health Commission, China National Committee on Ageing, HTI

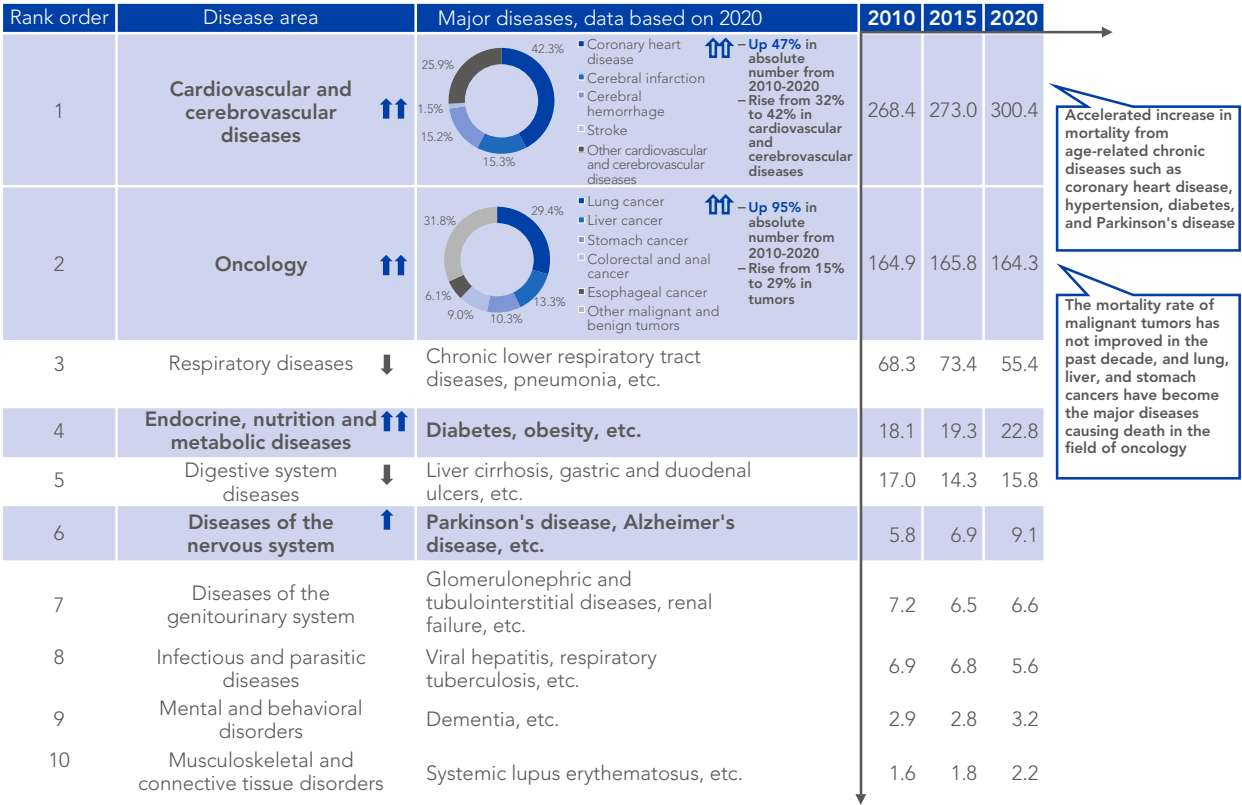
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The mortality rate of chronic diseases related to age and lifestyle, such as cardiovascular and cerebrovascular diseases, tumors, metabolic diseases and nervous system diseases, accelerated from 2010 to 2020. According to the statistics of the National Health Commission, cardiovascular and cerebrovascular diseases and tumors continue to be the leading cause of the mortality rate of residents in China, and chronic diseases such as diabetes, Parkinson's disease and Alzheimer's disease also see a growing trend. Specifically, the mortality rate of coronary heart disease (CHD) accounted for 42% of the total cardiovascular and cerebrovascular diseases in 2020, about 10% higher than that in 2010. The mortality rate of lung cancer accounted for 29% of the mortality rate of tumors, about 14% higher than that of 2010. It can be seen that coronary heart disease and lung cancer have the lion's share of cardiovascular and cerebrovascular diseases and tumors, and their proportions have expanded significantly.

Cardiovascular and cerebrovascular diseases: China ranks first in the world in the number of deaths from cardiovascular and cerebrovascular diseases. According to the statistics of WHO (World Health Organization)'s *Global Health Estimate Report 2019*, six of the top ten causes of death in the world are related to aging and lifestyle, including ischemic heart disease, stroke, airway and bronchial tumors and lung cancer, Alzheimer's disease and dementia, diabetes and kidney diseases. Four of them are related to living environment factors such as air pollution etc. In addition, the report points out that China has the highest number of deaths from cardiovascular and cerebrovascular diseases, followed by India, Russia, the US and Indonesia. Due to the population growth and aging, China's burden from cardiovascular diseases will continue to increase in the future.

Tumor: China ranks first in the world in the cancer incidence and the number of deaths. According to the 2020 *Global Cancer Statistics Report* released by WHO, there were about 19.29mn new cancer patients in the world, of which 4.57mn were from China, accounting for 23.7% of the world total. China has become the country with the largest cancer incidence. China accounted for about 30.2% of the world total in terms of the number of people who died of cancer. In the process of economic development, urbanization and aging population, China's burden from cancer has continued to increase.

Figure 2 Analysis of the mortality rate of urban residents in China from 2010 to 2020, by disease field (1/100,000 people)



Note: The disease area ranked 11 to 14 are 11) blood, hematopoietic organs and immune disease; 12) neonatal perinatal disease; 13) congenital deformities, deformations and chromosomal abnormalities; 14) Complications of pregnancy, childbirth and the postnatal period. The mortality rates of disease area ranked from 11 to 14 were below 2/100,000 and were omitted here.

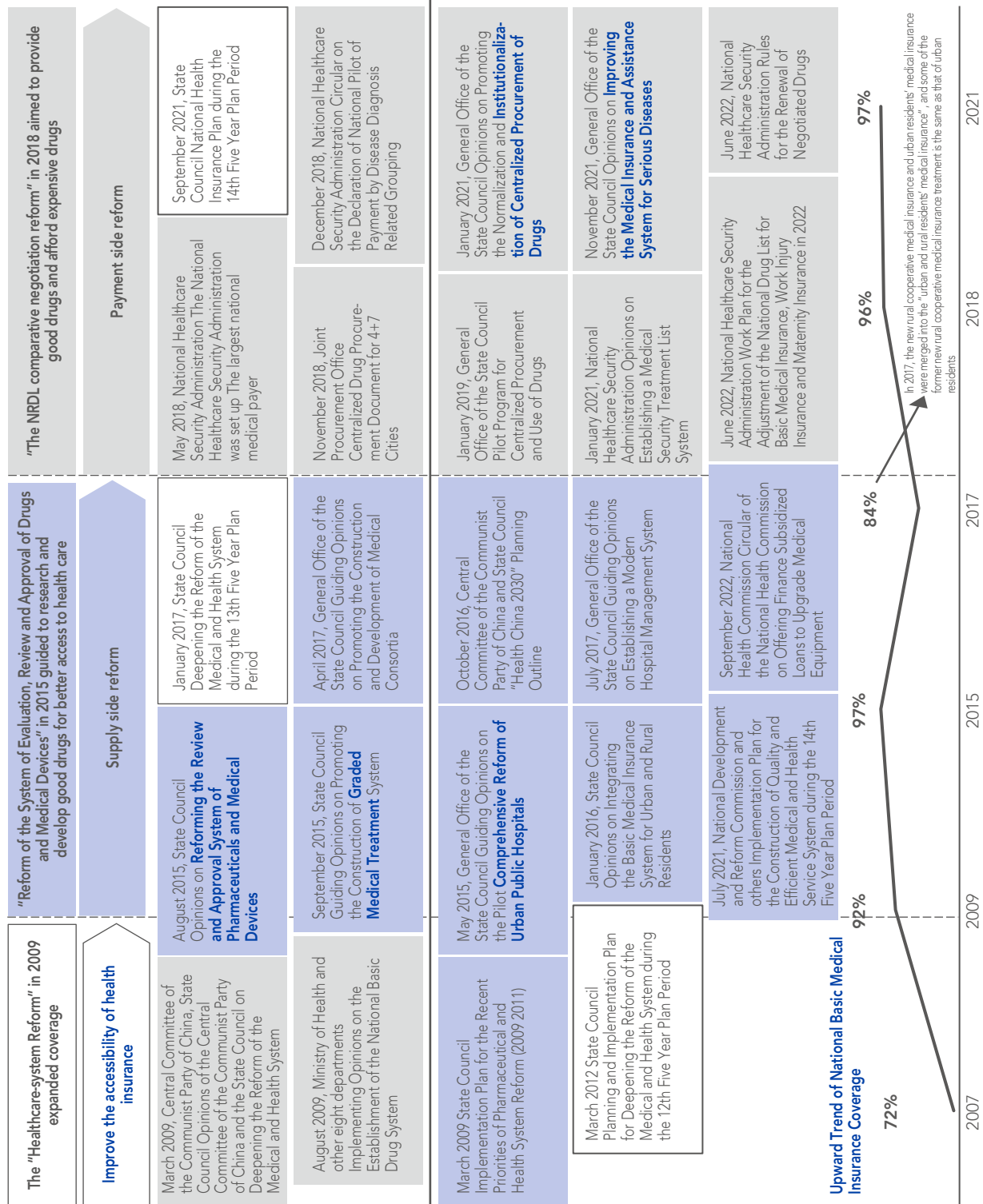
Source: China's Health and Family Planning Statistical Yearbook 2011, China's Health Statistical Yearbook 2016 and China's Health Statistical Yearbook 2021 published by the National Health Commission, HTI

1.1.2 Policy background: the accessibility of the Basic Medical Insurance (BMI) expanded, and industrial structure was upgraded, focusing on the long-term synergy between expenditure of BMI and the revenue from pharmaceutical manufacturing

The 13-year Healthcare Reform experienced 3 stages. The first stage: the "Healthcare-system Reform" in 2009 laid a foundation for expanding the accessibility of BMI. The second stage: the "Reform of the System of Evaluation, Review and Approval of Drugs and Medical Devices" in 2015 drove the supply side to develop good drugs and provide high-quality medical services. The third stage: in 2018, the National Healthcare Security Administration has established as the largest payer in the country that conducts the national centralized procurement of drugs and high-value medical consumables and China's NRDL (National Reimbursement Drug List) comparative negotiation to optimize the payment structure and reduce residents' pressure. Affected by phased policies, the coverage rate of the BMI expanded significantly, increasing from 72% in 2007 to 97% in 2015, and remained stable. With the construction of medical and health service system, and the stability and improvement in volume-based purchasing/procurement (VBP) and NRDL negotiation rules, China's pharmaceutical sector structure has further upgraded.

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Figure 3 Core policy of the three-stage medical reform and the upward trend of the coverage of medical insurance during 2009–2021



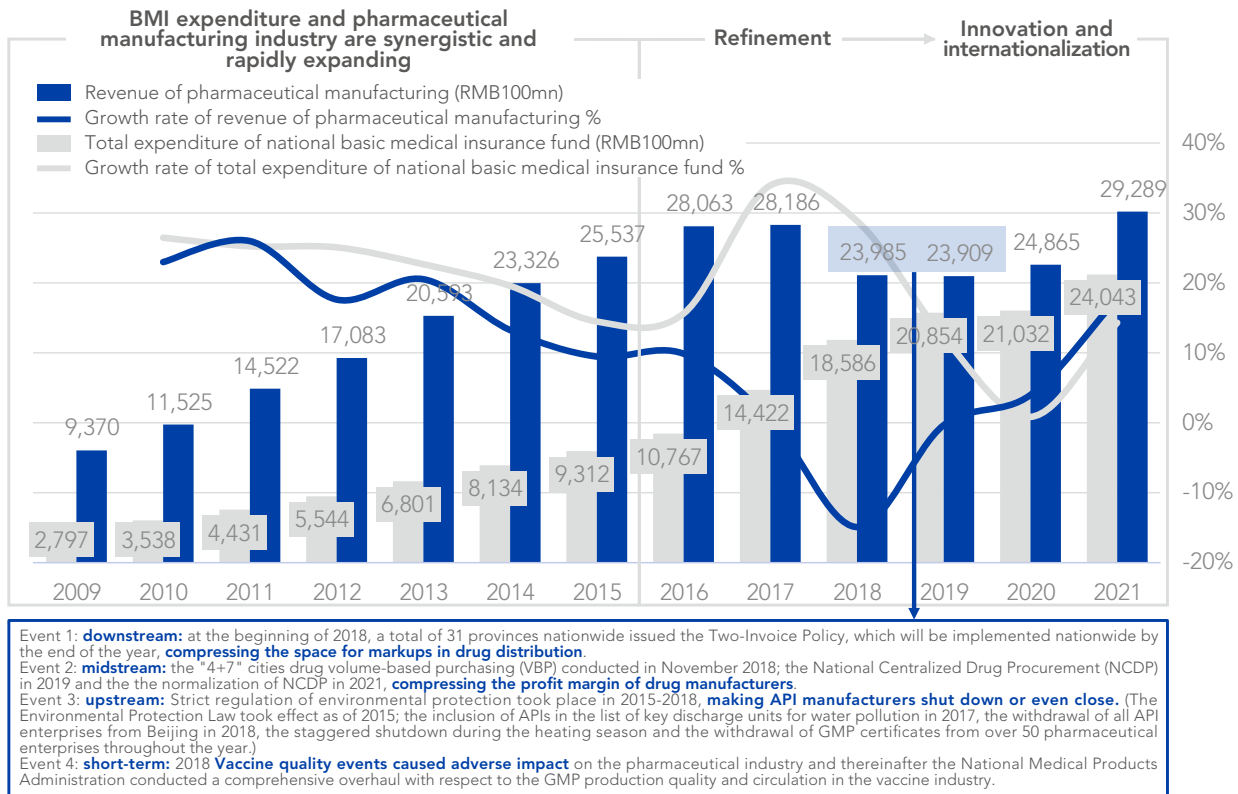
Source: the State Council, the General Office of the State Council, the National Development and Reform Commission, the National Health Commission, the National Healthcare Security Administration, the Joint Procurement Office, HTI

From 2009 to 2021, the BMI expenditure and the development of the pharmaceutical sector has long-term positive synergy. After the Reform of the System of Evaluation, Review and Approval of Drugs and Medical Devices in 2015, the procedures examination and approval of medical devices were refined. In 2018, the pharmaceutical sector was upgraded, moving towards innovation and internationalization. During 2018 to 2019, the revenue of the pharmaceutical manufacturing industry declined, mainly affected by reform factors, including **1) the downstream "Two-Invoice Policy"** reduced the mark-up space of drug circulation; **2) the midstream, from "4+7" city drug volume-based procurement**, to "National Centralized Drug Procurement (NCDP)" and "normalization of NCDP", reduced the profit margin of pharmaceutical companies; **3) the upstream API (Active pharmaceutical ingredient) environmental remediation**, production suspension, relocation of factories, or even close, and withdrawal of GMP (Good Manufacturing Practice of Medical Products) certificates from multiple pharmaceutical companies; **4) the vaccine quality incident**, which occurred in 2018, had a major impact on the pharmaceutical sector. With the expansion of the scope of "Two-Invoice Policy", the normalization of NCDP, the improvement of NRDL comparative negotiation reform rules and the product quality of pharmaceutical manufacturing, **the pharmaceutical sector was gradually becoming standardized across the board. From 2020 to 2021, the income of the pharmaceutical manufacturing industry rebounded gradually.**

In 2022, the "simple renewal of NRDL negotiations" rule was issued, the scale of China's New Infrastructure Construction was expanded by "The interest subsidized special healthcare loans" for medical equipment, and the selected mechanism for centralized procurement of consumables tended to be relaxed. Three favorable policies appeared, which helps to improve the overall rules for volume-based procurement (VBP) and NRDL negotiations renewal and help the future development of the sector.

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Figure 4 The expansion of Basic Medical Insurance (BMI) expenditure and the development of the pharmaceutical sector show a long-term positive synergy trend



Source: National Healthcare Security Administration, public information, Wind, HTI

1.2 Overview of the pharmaceutical market

1.2.1 Current status: policies promote the evolution of pharmaceutical sector segments and upgrade the structure of the pharmaceutical sector

The medical reform policy promoted the evolution of industry segments

Drugs: the supply-side and demand-side reforms promoted the evolution of the segments of the pharmaceutical sector. The supply-side reform that started in 2015 took the lead in driving the high growth rate of technological innovation-driven fields, mainly including the fields of innovative drugs and medical devices. Pharmaceutical enterprises transformed from imitation to innovation, from sales-driven to product-driven. During this period, a large number of technological innovation-driven biotechnology companies emerged.

Medical devices: With the technical progress of domestic enterprises and the state policy encouraging domestic substitution, the field of medical devices presented a new development trend from agency to originality, from low-end to high-end, from home to abroad. The technical innovation of medical device-related hard technology companies was highly active, and the process of domestic substitution was accelerated. In particular, high-end medical devices gradually became a new highland for the development of domestic enterprises, further highlighting the globalization opportunities.

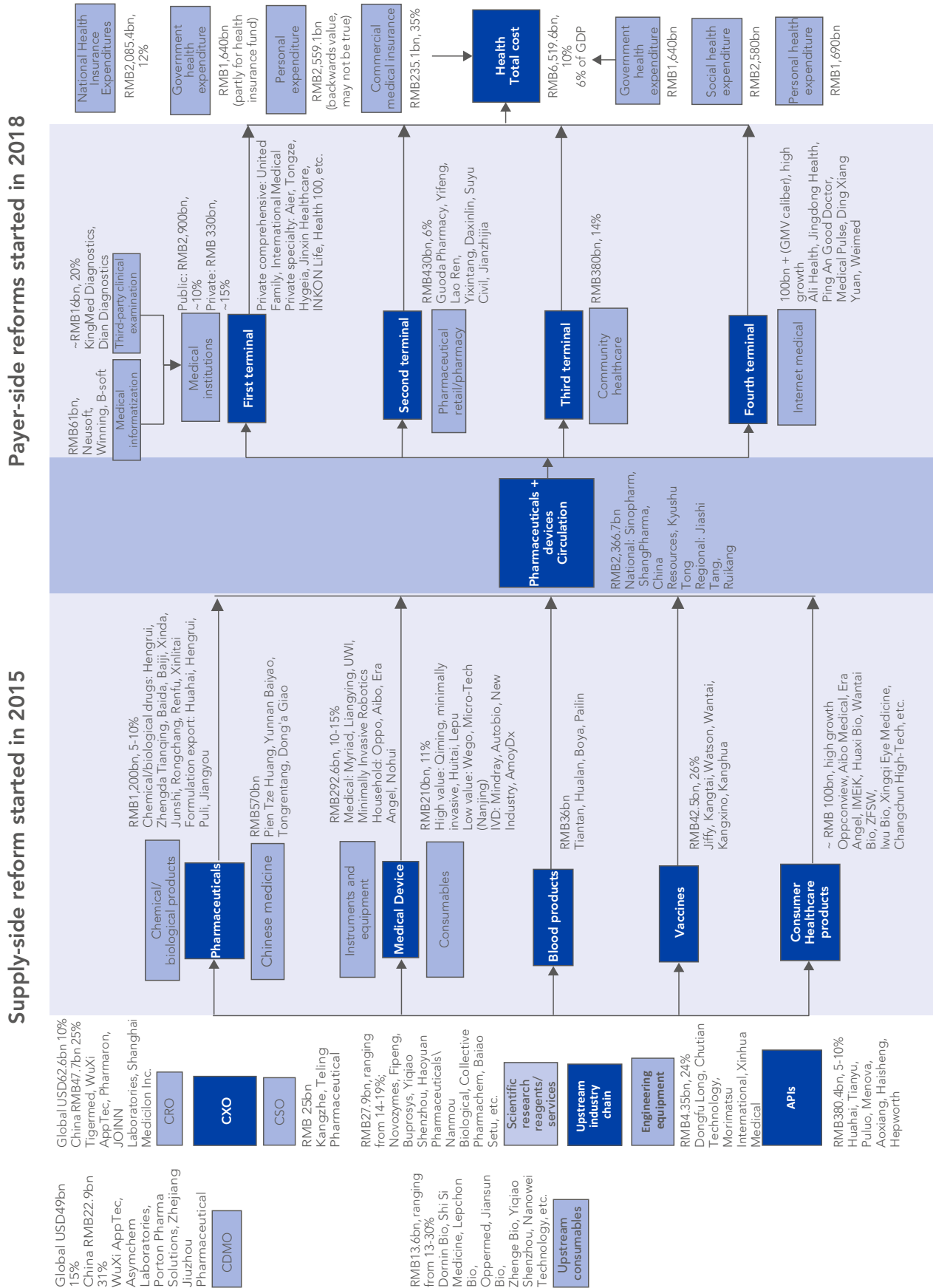
CXO (Contract X Organization): with the transformation of China engineers' dividend into a growth point, the pharmaceutical sector ushered in a harvest period in structure upgrading. CXO, benefiting from the pharmaceutical sector, showed a trend of prosperity and a good momentum of domestic innovation due to the demand-driven and manufacturing cost advantages. Some enterprises with strong international business capabilities and striking advantages in sub-sectors developed rapidly.

Upstream industrial chain, etc.: At the same time, the upstream industrial chain of drugs was developing rapidly, and a number of innovative R&D and production enterprises with core technical barriers emerged and developed in the fields of upstream consumables, scientific research reagents/services, engineering equipment and APIs. In addition, the rapid development of sub-sectors also driven the innovative development of downstream blood products, vaccines and consumer healthcare products. Under the background of the COVID-19 epidemic and public health events, as well as the upgrading of consumption channels, vaccine and consumer healthcare sectors were growing rapidly in China.

Medical service: China's current medical service system is dominated by public hospitals, supplemented by private hospitals, and the state continues to encourage the development of private hospitals. The payer reform, which started in 2018, has greatly improved the accessibility of medical services and alleviated the problem of insufficient and uneven medical resources in China. The reform of the first terminal of public hospital continued to deepen, and the private force emerged and developed. The second terminal of pharmacy expanded rapidly due to factors such as digitalization and fine management. The fourth terminal drove the rapid growth of Internet medical care relying on digital innovation platforms and strong user stickiness. Affected by the diversified development of terminals and the progress of medical product technology, some new models such as DTP pharmacy (Direct to patient) and O2O (online to offline) appeared. Under the payer reform, the pharmaceutical sector keeps developing.

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Figure 5 Market size chart of China's pharmaceutical sector and selected investment projects (data of 2019)



Source: annual corporate reports, Wind, HTI

1.2.2 Market changes: The pharmaceutical industry has broad space for development and the enterprises in the field has strong profitability. It is important to pay attention to companies that are in tune with the times

As of October 22, 2022, in terms of A-share/H-share market value, TOP 20 companies were those boasting of significant technological innovation and brand-driven characteristics, which changed significantly compared with the situation in 2009, which was dominated by pharmaceutical circulation, chemical drugs and TCM. Companies that have been on the list for 10 years include Hengrui Pharmaceutical, Yunnan Baiyao and Fosun Pharmaceuticals, and their market values see remarkable growth. In the future, with the upgrading of China's pharmaceutical sector structure, the market will focus more on technological innovation products and highly value-added medical products and services, and pay more attention to technological innovation and brand sustainability.

Figure 6 Analysis of TOP 20 companies in the pharmaceutical sector during 2009–2022 and their industries

Top 20 pharmaceutical and biological companies by market cap. as at the end of 2009			Top 20 pharmaceutical and biological companies by market cap. as at the end of 2015			Top 20 pharmaceutical and biological companies by market cap. as at 20221022		
The Company	Market cap. (RMB100mn)	Affiliated market	The Company	Market cap. (RMB100mn)	Affiliated market	The Company	Market cap. (RMB100mn)	Affiliated market
Sinopharm Holdings	549	Distributor of health care products	Shanghai RAAS	1096	Biological products	Mindray bio-Medical	4020	Medical devices
Hengrui Medicine	326	Chemical preparation	Hengrui Medicine	961	Chemical preparation	Hengrui Medicine	2550	Pharmaceutical companies
Yunnan Baiyao	323	Chinese medicine	Yunnan Baiyao	756	Chinese medicine	WuXi AppTec	2200	CRO
Jilin Aodong Pharmaceutical	282	Chemical preparation	ST-Kangmei Pharmaceutical	745	Chinese medicine	Aier Eye Hospital	2192	Medical services
WEGO Holding	245	Instruments	Sinopharm Holdings	721	Pharmaceuticals	WuXi AppTec	2014	CRO
Fosun Pharma	242	Chemical preparation	Tong Ren Tang	612	Chinese medicine	Pien Tze Huang Pharmaceutical	1553	Chinese medicine
Harbin Pharmaceutical	229	Chemical preparation	Fosun Pharma	525	Chemical preparation	Zhifei Biological Products	1498	Vaccines
Lepu Medical	208	Instruments	Shanghai Pharmaceuticals	491	Chemical raw materials	WuXi Biologics	1494	Biotech
Hualan Biological	200	Biological products	Tianshili Pharmaceutical	442	Chinese medicine	BeiGene	1262	Biotech
CR Sanjiu	195	Chinese medicine	Sino Biopharmaceutical	438	Chemical preparation	JD Health	1251	Internet medical

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Top 20 pharmaceutical and biological companies by market cap. as at the end of 2009			Top 20 pharmaceutical and biological companies by market cap. as at the end of 2015			Top 20 pharmaceutical and biological companies by market cap. as at 20221022		
The Company	Market cap. (RMB100mn)	Affiliated market	The Company	Market cap. (RMB100mn)	Affiliated market	The Company	Market cap. (RMB100mn)	Affiliated market
ST-Kangmei Pharmaceutical	180	Chinese medicine	Fosun Pharma	436	Chemical preparation	BeiGene	1155	Biotech
Dong-E-E Jiao	171	Chinese medicine	CSPC Pharmaceutical Group	392	Chemical preparation	Wantai Bio-Pharmaceutical	1076	Vaccines
Zhejiang NHU	167	Chemical raw materials	Sihuan Pharmaceutical	380	Chemical preparation	Imeik Technology	978	Medical aesthetics
Zhejiang Medicine	160	Chemical raw materials	Health 100	374	Medical services	Yunnan Baiyao	968	Chinese medicine
CR Double-Crane Pharmaceuticals	135	Chemical preparation	Ali Health	367	Internet medical	CSPC Pharmaceutical Group	845	Pharmaceutical companies
Tiantan Biological	130	Biological products	Kanghong Pharmaceutical	366	Chemical preparation	Changchun High-Tech	793	Pharmaceutical companies
Joincare Pharmaceutical	128	Chemical preparation	Baiyunshan Pharmaceutical	365	Chinese medicine	Huadong Medicine	790	Pharmaceutical companies
Guilin Sanjin	127	Chinese medicine	Guizhou Bailing	362	Chinese medicine	Fosun Pharma	783	Pharmaceutical companies
North China Pharmaceutical Group	120	Chemical preparation	Huadong Medicine	356	Chemical preparation	Fosun Pharma	717	Pharmaceutical companies
Livzon Pharmaceutical	117	Chemical preparation	Er Kang Pharmaceutical	346	Chemical raw materials	Tigermed	706	CRO

Note: H share/A share Fosun Pharma are both listed. Among the Top 20 pharmaceutical and biological companies by market cap as at 20221022, the market cap of H share Fosun Pharma was RMB78,300 and was RMB71,700 for A share.

Source: Wind, HTI; Note: Exchange rate conversion HKDCNY=0.83

1.2.3 Business model development: technology innovation-driven and brand-driven

China's pharmaceutical sector segments can be divided into two categories: technology innovation-driven and brand-driven, as well as the CXO model benefiting from the pharmaceutical sector.

The model of technological innovation mainly involves the fields of innovative drugs and medical device-related hard technology.

1) **Innovative drugs:** a market size of RMB990bn in 2021, with an expected compound annual growth rate of about 10% in the next three years.

✓ **Enterprise:** Chinese pharmaceutical enterprises have experienced the changing from sales channels to product-driven channels, and from imitation-driven to innovation-and multi-pipeline layout-driven. The clinical effect-oriented product R&D has been deepened, and innovative products have been launched successively, which drives the expansion of the pharmaceutical market and the all-round development of the industrial chain.

✓ **Technology:** with the deepening of the global and China's medical R&D technologies and the research on disease mechanism, technology keeps evolving. From traditional small molecule drugs, small molecule targeted drugs and macromolecular antibody drugs to innovative cell and gene therapy, the treatment effect of drugs has been improved, targeting enhanced, and toxic and side effects minimized. The personalized treatment concept has been further highlighted.

✓ **Policy:** since June 2022, the National Healthcare Security Administration issued the *2022 Work Plan on Adjusting the List of Medicines for National Basic Medical Insurance, Work-related Injury Insurance and Maternity Insurance*. In the plan, the renewal rules has added the next session of NRDL negotiation, and the certainty of business development and the route of the industry's blockbuster varieties to NRDL have become clearer. It helps innovative pharmaceutical enterprises with new varieties to be launched successively, with blockbuster varieties to enter the NRDL, and with the potential to go overseas.

I. Review of the past decade

2) **Medical device-related hard technology: the market size was estimated to be RMB910bn in 2021, with an expected compound annual growth rate of about 15% in the next 3 years.**

- ✓ **Enterprise:** in the past, China's medical device industry was dominated by overseas enterprises. Under the background of technological innovation and domestic substitution, China's medical devices and medical device consumables showed a good iterative trend from agency to originality, from low-end to high-end, and from home to abroad. In the future, the market is expected to pay attention to the development of medical device-related hard technology and the globalization opportunities of China's medical device enterprises.
- ✓ **Technology:** i) China's domestic substitution of medical equipment has come a long way, and the localization rate of diagnostic equipment such as monitors and defibrillators has hit new highs, reaching 60%-70%. At the same time, imaging equipment such as ultrasound, CT, MRI and other product categories also show a good trend of accelerated substitution import products. A number of domestic enterprises have expanded their product lines from low-end products to high-end products, and built moats and technical barriers, demonstrating excellent brand power in the competition with imported enterprises. ii) On the other hand, China's high-value and low-value consumables for medical devices have been constantly innovating, such as stents, interventional consumables, orthopedic consumables, valves, electrophysiology and other high-value consumables which are on a par with imported counterparts. Low-value consumables have occupied a place in the international arena and constantly expanded their dominant position. iii) In the field of IVD (in vitro diagnosis), domestic manufacturers have made continuous efforts to break the dominate position of foreign players (Roche, Abbott, Siemens and Danaher etc.) and continue to expand upstream to solve the bottleneck of raw materials, driving the development of IVD field.
- ✓ **Policy:** the state encourages medical device innovation and the number of approved innovative devices grows rapidly every year. The policy encouraged domestic substitution from top-level documents to local documents, which showed high consistency, which is to realize domestic substitution of high-end equipment and innovative consumables. China is seeing rapid development of the medical devices. Further pay attention to active innovation product fields and the process of domestic substitute imported products.

The main areas involved in the brand sustaining model include medical services, consumer medical care, and Chinese medicine.

3) Healthcare services: in 2021, the market size was estimated to be RMB910bn, with an expected compound annual growth rate of about 13% in the next 3 years.

- ✓ The core of Healthcare service industry is brand and its moat creates sustainable terminal value. In addition, the healthcare service platform has great value, and the healthcare expenses have the possibility of sustainable growth. Under the background that the state continues to encourage the society to engage in healthcare services and the first terminal private hospital develops, the healthcare service industry continues to see new models and new contents, and their brand power is constantly improved.

4) Consumer healthcare: blockbuster product creates large companies, consumer healthcare products has both consumer and medical dual attributes.

- ✓ In terms of the current consumption characteristics of Chinese residents, large population base and consumption upgrading continuing stimulate the development of consumer healthcare industry. The development experience of consumer healthcare industry in the US presents that blockbuster product creates large companies. Consumer healthcare has the dual attributes of consumption and healthcare. As the consumption habits of China residents have not yet stabilized, it is expected to usher in a rapid growth during the consumption upgrading.

5) Traditional Chinese medicine (TCM): the market size is estimated to be RMB450bn in 2021 and expected to grow at a compound annual growth rate of about 6% in the next three years.

- ✓ China's TCM industry has a long history, and the brand value of "Time-honored Brand" has been certified by the state (the Administrative Measures for Certification of Chinese Time-honored Brands). With its solid consumer and high accessibility, TCM is highly accepted by Chinese residents. It has long-term development potential under the background of favorable policies.

CXO model benefits from the development of the pharmaceutical sector

6) CXO: in 2021, the market size of CRO was estimated to be RMB65bn, with an expected compound annual growth rate of about 31% in the next 3 years; the market size of CDMO was estimated to be RMB43bn, with an expected compound annual growth rate of about 31% in the next 3 years.

- ✓ CXO industry is a talent-intensive industry, which needs a large number of medical R&D professionals. China has accumulated a large number of undergraduate and master graduates of related majors, and the return of a number of overseas talents with advanced technology has brought considerable manpower to the CXO industry. China's manufacturing cost advantage drives the global pharmaceutical outsourcing industry chain to transfer to China, and stimulated the high growth of China's CXO industry and the emergence of local innovative CXO enterprises. At present, China's share in the global pharmaceutical R&D outsourcing is still modest. Therefore, companies with strong international business capabilities and prominent dominant position in niche areas still have great development space.

Section II.

Opportunities in the Next Decade



II. Opportunities in the next decade

2.1 Innovation-driven: innovative drugs, medical devices

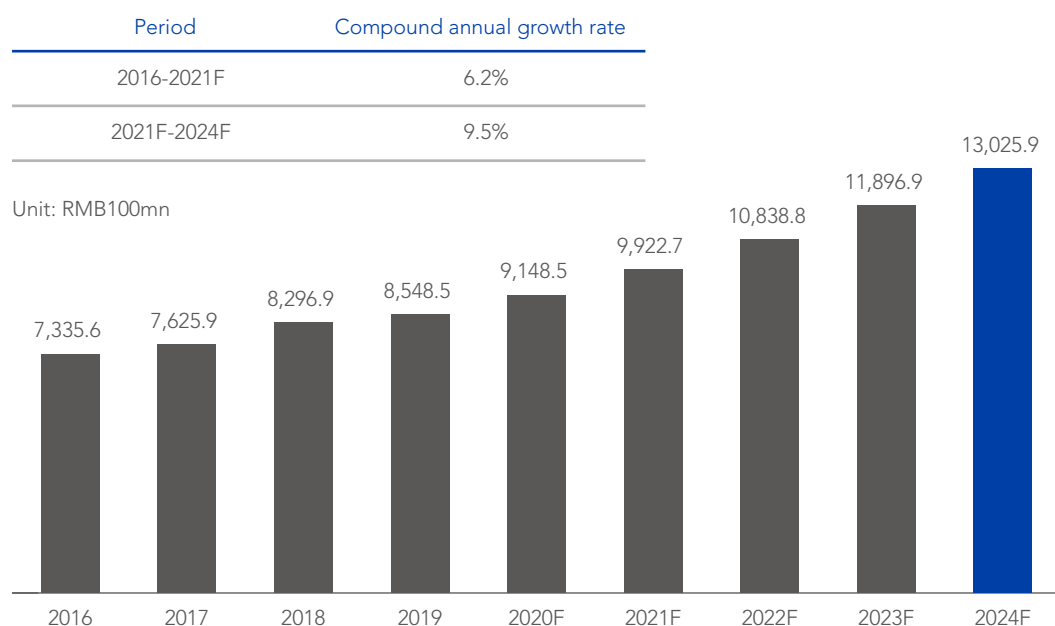
2.1.1 Innovative drugs

2.1.1.1 Market overview: in 2021, the market size was estimated to be RMB990bn, with an expected compound annual growth rate of about 10% in the next 3 years. Sales-driven shifted to product-driven, and imitation-driven to innovation-driven

Under the background of technological innovation and demand development, China's pharmaceutical enterprises have experienced the transformation from sales-driven to product-driven, from imitation-driven to innovation-and pipeline-layout-driven. At the same time, a large number of innovative pipelines have been laid out, and the market size has also expanded. In 2021, the market size of innovative drugs in China was estimated to be RMB990bn. Driven by the continuous launch of innovative drugs and other factors, the market is expected to grow at a compound annual growth rate of 10% in the future.

Since 2018, with the implementation of the medical reform and centralized procurement of drugs, the pharmaceutical sector faced drastic changes. Large pharmaceutical companies need to shift from sales-driven to product-driven innovative enterprises. Meanwhile, biotech companies have developed rapidly and surpassed others with R&D speed and pipeline layout by increasing R&D investment, flat management, strong execution and employee motivation. In the future, the core competitiveness of the pharmaceutical sector will shift to product strength and pipeline. Pharmaceutical companies need a fast and comprehensive pipeline layout to enter the global competition in R&D of new drugs.

Figure 7 Market size of innovative drugs in China and forecast, 2016–2024F



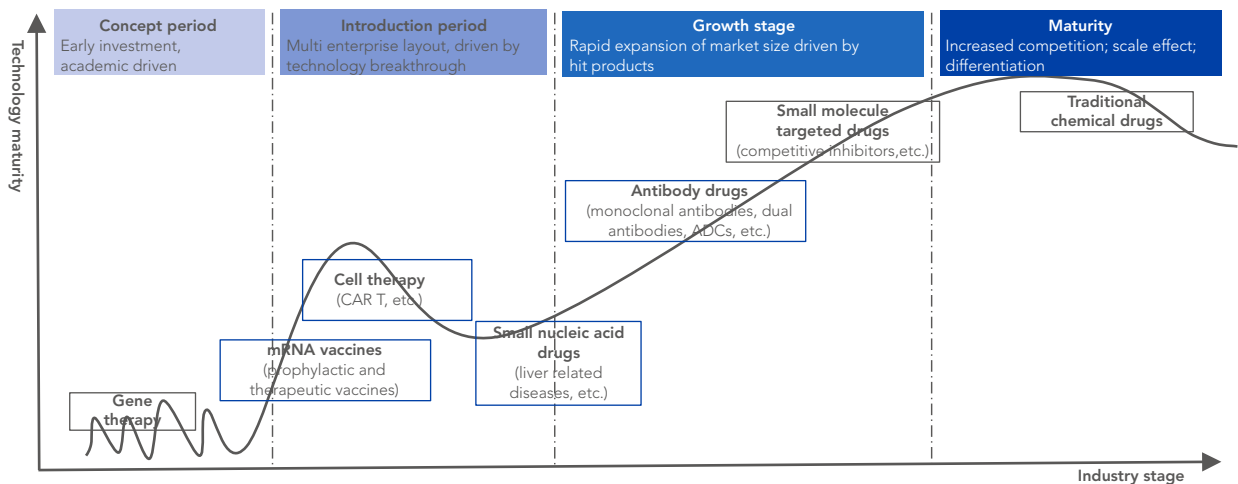
Source: Tigermed Prospectus, HTI

II. Opportunities in the next decade

2.1.1.2 Development trends: the technology continues to evolve, entering the era of cell and gene therapy

1) **Divided by technical stage, small molecule targeted drugs and antibody drugs are in a high-speed growth period, and the industry remains active.** With the monoclonal antibody drugs from international and domestic manufacturers approved continuously, research on Antibody–Drug Conjugates (ADC) and multi-specific antibodies has been carried out to improve targeting and efficacy. 2) **Immune cell therapy is in the introduction stage and the technology is advancing rapidly, with rapid increase in technology maturity.** Under the trend of clinical demand-oriented drug R&D, immune cell therapy is effective in the treatment of multiple types of recurrent and refractory tumors. Currently, the treatment field is gradually expanding from hematological tumors to solid tumors. With its application scope becoming wider, it is expected to become a good supplement to the existing treatment schemes. 3) **Driven by COVID-19 epidemic, breakthrough progress has been made in mRNA vaccine.** In 2021, the COVID-19 vaccine (Comirnaty) jointly developed by Pfizer and BioNTech realized a revenue of USD36.8bn. The R&D and launch of vaccines in COVID-19 has greatly accelerated the R&D for the efficacy and delivery system of nucleic acid drugs worldwide, and promoted the introduction of nucleic acid drugs. **Global drug innovation progress has entered the era of cell and gene therapy.**

Figure 8 Analysis of the development stage of innovative drug technology



Source: HTI

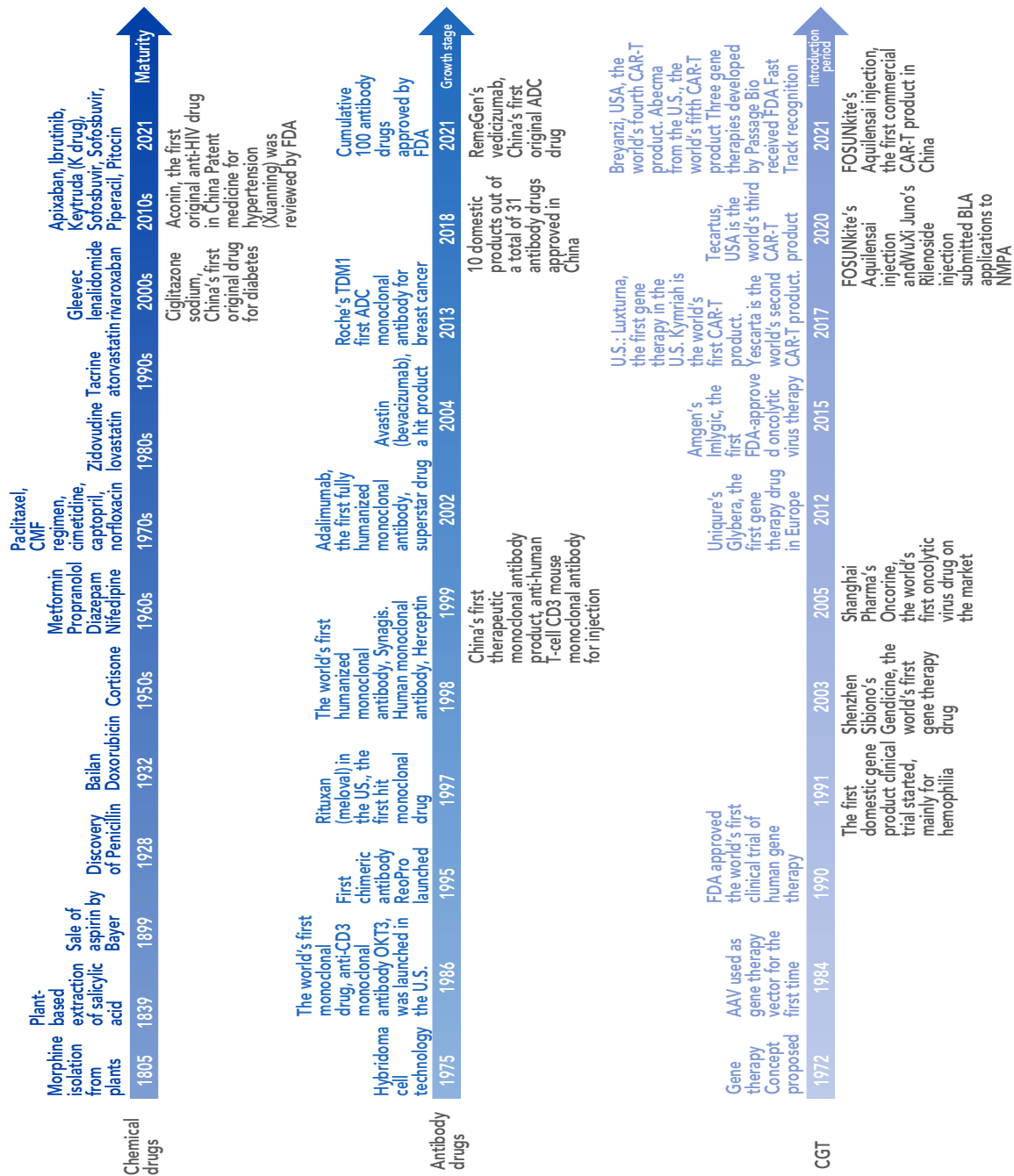
From chemical drugs and antibody drugs to cell and gene therapy, drug R&D follows the central rule. With the progress of drug R&D technology and further understanding of disease pathogenesis, chemical drugs have developed from traditional chemical drugs to small-molecule targeted drugs. In 2001, Gleevec developed by Novartis became the first small-molecule targeted drug to go to the market in the world. Soon afterwards, small-molecule targeted drugs developed rapidly, and the technological innovation of chemical drugs gradually matured. At the same time, some innovative technologies also show great potential in solving the problem of undruggable targets. For example, PROTAC technology (proteolysis-targeting chimeras technology) can produce drugs for targets without obvious active sites, and has the advantage of reducing drug resistance.

With the improvement of drug R&D technology, Rituximab, the world's first monoclonal antibody drug, was approved by FDA, and it was also the first bombshell (with annual sales of more than USD1bn) monoclonal antibody drug. After that, monoclonal antibodies, such as Trastuzumab and Adalimumab, emerged one after another, and the antibody drug market entered a high-speed growth period. By 2021, FDA had approved a total of 100 antibody drugs. The R&D of antibody drugs in China was constantly innovating. By 2018, 10 domestic antibody drugs had been launched. At the same time, in order to improve the specificity and targeting, the field of antibody drugs was also innovating, and the fields of multi-specific antibodies and ADC drugs were explored. In 2021, RemeGen's Disitamab Vedotin was launched as the first original ADC drug in China, which greatly enriched the connotation of antibody drug therapy.

With the development of global research on adenovirus vector, oncolytic virus, liposome vector, genetic engineering and other technologies, the efficacy of cell and gene therapy for refractory or recurrent diseases, as well as genetic diseases for which there is no effective clinical treatment scheme, was gradually verified, and the world entered the era of cell and gene therapy. Specifically, cell therapy received high attention in the treatment of refractory and recurrent hematological tumors, and the global R&D was actively expanded to the frontline therapy with great potential market.

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Figure 9 Summary and analysis of certain of global drug R&D history and major events



Source: FDA, NMPA, public information, HTI

2.1.1.3 Policy development: further improvement of NRDL negotiation rules, successive listing of new products, entry of heavyweight products into NRDL and globalization opportunities drive the development of innovative drug market

In 2022, the new rules of NRDL negotiation came into effect, the new simple renewal rules became clear, and the risk of policy uncertainty was reduced. Since the establishment of the National Healthcare Security Administration in 2018, a series of reforms, such as centralized procurement, NRDL negotiation, and adjustment of the National Essential Medicine List, have had a great impact on the payment side of China's drug market. On the one hand, the reform of Basic Medical Insurance (BMI) has improved the price system of innovative drugs and generic drugs in China; on the other hand, the market has concerns about the stability of the pricing system of innovative drugs initially. On June 13, 2022, the 2022 Work Plan on Adjusting the List of Medicines for National Basic Medical Insurance, Work-related Injury Insurance and Maternity Insurance and related documents were released to seek public comments, which marked the official kickoff of the NRDL comparative negotiation in 2022. The biggest highlight of the NRDL negotiation plan in 2022 is a clear and quantitative simple renewal rule which greatly reduces the risk of renegotiation of new drugs in the catalogue for two years, and is also conducive to the formation of the capital market's expectation of a long-term pricing system for innovative drugs. At the same time, the scope of application was also expanded, appropriately inclined to drugs for children and rare diseases. More drugs are expected to participate in the negotiation and enter the NRDL and have the potential to increase sales volume.

Historical comparison: among the products due for renewal in 2021, 26 varieties reduced prices by 17.6% on average, while 63 did not reduce prices. In 2021, 89 varieties were due for renewal. 26 varieties reduced prices by 17.6% on average, with the biggest decrease being Ilaprazole Sodium for Injection (down by 54.5%), and the other 63 renewed varieties did not reduce prices.

Figure 10 Analysis of the price reduction of drugs due for renewal in 2021

Drug name	Rate of reduction	Drug name	Rate of reduction	Drug name	Rate of reduction	Drug name	Rate of reduction
Ilaprazole Sodium for Injection	54.49%	Lidocaine Cataplasms	5.00%	Morinidazole sodium chloride injection	0.00%	Ganyi Capsules	0.00%
Roxadustat Capsules	43.46%	Furoquantinib Capsules	4.99%	Miglustat Capsules	0.00%	Donglingcao drops	0.00%
Compound amino acid injection	37.83%	Phlegm heat clear capsules	4.88%	Nimotuzumab Injection	0.00%	Duzhi wan	0.00%
Infliximab	35.82%	Ledipasvir and Sofosbuvir Tablets	3.38%	Nemonoxacin Malate Capsules	0.00%	Compound Huang Dai Ttablets	0.00%
Compound amino acid injection	30.51%	EYLEA (Aflibercept Intravitreal Injection)	0.00%	Posaconazole oral suspension	0.00%	Baicalin anti-cough granules	0.00%
Allisartan Isoproxil Tablets	29.39%	Exenatide injection	0.00%	Tafluprost eye drops	0.00%	Naixin'an Jiaonang	0.00%
Sofosbuvir-velpatasvir	24.68%	Bosentan tablets	0.00%	Teriflunomide tablets	0.00%	Qidan tongluo granules	0.00%
Elvitegravir, Cobicistat, Emtricitabine and Tenofovir Alafenamide Fumarate Tablets	20.47%	Bosentan dispersible tablets	0.00%	Umeclidinium Bromide and Vilanterol Trifenatate Powder for Inhalation	0.00%	Astragalus granules	0.00%
Compound amino acid injection (18AA V SF)	19.50%	Delamanid tablets	0.00%	Chidamide Tablets	0.00%	Qixiong Tongluo capsules	0.00%
Conbercept	17.00%	Dexamethasone intravitreal implant	0.00%	Everolimus tablets	0.00%	Injection marijuana oral liquid	0.00%

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Drug name	Rate of reduction	Drug name	Rate of reduction	Drug name	Rate of reduction	Drug name	Rate of reduction
Astragalus Tongxian soft capsules	12.86%	Multi-Oil Fat Emulsion Injection (C6~24)	0.00%	Indacaterol Maleate and Glycopyrronium Bromide Powder for Inhalation	0.00%	Esophageal Ping San	0.00%
Mecapegfilgrastim Injection	12.00%	Bedaquiline fumarate tablets	0.00%	Recombinant Human Endostatin Injection	0.00%	Saffron Total glucoside tablets	0.00%
Selexipag Tablets	10.00%	Gadoteridol Injection	0.00%	Recombinant cytokine gene derived protein	0.00%	Haebijing Injection	0.00%
Ginseng Wu Yi Kidney Tablets	9.72%	Monoammonium Glycyrrhizinate and Cysteine and Sodium Chloride Injection	0.00%	Omalizumab for Injection	0.00%	Ginkgo biloba diterpene lactone glucosamine	0.00%
Elbasvir and Grazoprevir Tablets	8.34%	Arginine glutamate injection	0.00%	Urinary Kallidinogenase for Injection	0.00%	Ginkgolide Injection	0.00%
Rucotinib phosphate tablets	7.01%	Ranibizumab Injection	0.00%	Recombinant human brain natriuretic peptide for injection	0.00%	Astragalus polysaccharide for injection	0.00%
Liraglutide injection	7.00%	Riociguat Tablets	0.00%	Recombinant Human Prourokinase for Injection	0.00%	Zhusheyong Yiqifumai	0.00%
Aletinib hydrochloride capsule	7.00%	Lixisenatide Solution for Injection	0.00%	Recombinant Human Coagulation VII for Injection	0.00%		
Danshen polyphenolic acid for injection	6.99%	Pyrrrolitinib maleate tablets	0.00%	Retepiase(rPA)for injection	0.00%		
Fruquintinib Capsules	5.00%	Macitentan tablets	0.00%	Ba Wei Qi Long granules	0.00%		

Source: National Healthcare Security Administration, Pharmcube, HTI

Historical comparison: In 2021, the successfully negotiated varieties of new indications decreased by 19.1% on average. In 2021, 19 new indications were successfully negotiated during the drug agreement period, and the health insurance payment price dropped by 19.1% on average. Among them, the biggest drop in the medical insurance payment price was from Sacubitril/valsartan tablets (68.0%), and the smallest drop was from Nilotinib capsules (0.8%).

Figure 11 Analysis of the price reduction range of successfully negotiated varieties of new indications in 2021

Drug name	Rate of reduction	Indications (change)	Drug name	Rate of reduction	Indications (change)
Sacubitril Valsartan Sodium Tablets	68.04%	1. Limited to chronic heart failure (NYHA class II IV). (2. Primary hypertension.)	Belimumab powder for concentrate for solution for infusion	7.28%	It is indicated in combination with conventional therapy in adults with active, autoantibody positive SLE with high disease activity despite conventional therapy (children over 5 years of age).
Sindilizumab	62.01%	1. Relapsed or refractory classic Hodgkin's lymphoma treated with at least second line systemic chemotherapy. (2. Advanced or recurrent non squamous cell non small cell lung cancer that is negative for epidermal growth factor receptor (EGFR) mutation and negative for mesenchymal lymphoma kinase (ALK) without systemic therapy. 3. First line treatment of non surgically resectable advanced or recurrent squamous cell non small cell lung cancer. 4. First line treatment of unresectable or metastatic hepatocellular carcinoma that has not received prior systemic therapy.)	Anrotinib hydrochloride Capsules	4.46%	1. Locally advanced or metastatic NSCLC that has progressed after receiving at least 2 previous systemic chemotherapy regimens. 2. NSCLC that has progressed or relapsed after receiving at least 2 previous chemotherapy regimens. 3. Adenoid soft tissue sarcoma, clear cell sarcoma, and other advanced soft tissue sarcomas that have progressed or relapsed after at least one prior anthracycline containing chemotherapy regimen. (4. Locally advanced or metastatic medullary thyroid carcinoma with disease progression that is unresectable.)
Icotinib Hydrochloride Tablets	37.86%	1. Locally advanced or metastatic NSCLC with sensitive mutations in EGFR. (2. Locally advanced or metastatic NSCLC after failure of at least one prior chemotherapy regimen. 3. Post operative adjuvant therapy in stage II IIIA NSCLC with EGFR sensitive mutations.)	Jinhua Qingxian Granules	3.89%	(Dredging wind and promoting lung, clearing heat and detoxification. It is used for mild cases of simple influenza, where the Chinese medicine identifies the evidence of wind heat offending the lung. It can be used for fever, cough and malaise caused by light and common type in the routine treatment of COVID 19.) Note: 2020 does not specify the scope of indications.
Tirelizumab	33.49%	1. Relapsed or refractory classic Hodgkin's lymphoma treated with at least second line systemic chemotherapy. 2. Locally advanced or metastatic uroepithelial cancer that has failed platinum containing chemotherapy including neoadjuvant or adjuvant chemotherapy within 12 months of progression with high PD L1 expression. (3. Combined paclitaxel and carboplatin for first line treatment of non surgically resectable locally advanced or metastatic squamous non small cell lung cancer. 4. Hepatocellular carcinoma that has undergone at least one systemic therapy.)	Cetuximab	3.27%	1. Metastatic colorectal cancer with wild type RAS gene. (2. Squamous cell carcinoma of the head and neck.)
Niraparib Tosylate Capsules	23.60%	(1. Maintenance therapy after remission with first line platinum containing chemotherapy in adult patients with advanced epithelial ovarian cancer, fallopian tube cancer or primary peritoneal cancer.) 2. Maintenance therapy after remission of platinum containing chemotherapy for platinum sensitive recurrent epithelial ovarian cancer, fallopian tube cancer or primary peritoneal cancer.	Nilotinib Capsules	0.82%	1. Philadelphia chromosome positive adults with chronic phase chronic myeloid leukemia and (children over 2 years of age) 2. Adults in the chronic or accelerated phase of previously treatment resistant Philadelphia chromosome positive chronic myeloid leukemia and (children 2 years of age or older in the chronic phase).
Zebutinib capsules	14.14%	1. Adults with at least one prior therapy for set cell lymphoma. 2. Adults with chronic lymphocytic leukemia/small lymphocytic lymphoma who have received at least one prior therapy. (3. Adults with Walden's macroglobulinemia who have received at least one prior therapy.)			
Apatinib mesylate tablets	8.98%	1. Advanced gastric adenocarcinoma or adenocarcinoma of the gastro esophageal junction that has progressed after 2 types of chemotherapy. (2. Advanced hepatocellular carcinoma that has failed after first line systemic therapy.)			
Treprolizumab	8.95%	1. Unresectable or metastatic melanoma that has failed systemic systemic therapy. (2. Recurrent/metastatic nasopharyngeal carcinoma that has failed prior second line or higher systemic therapy. 3. Locally advanced or metastatic uroepithelial carcinoma that has failed platinum containing chemotherapy including neoadjuvant or adjuvant chemotherapy within 12 months of progression.)			

Source: National Healthcare Security Administration Pharmcube, HTI

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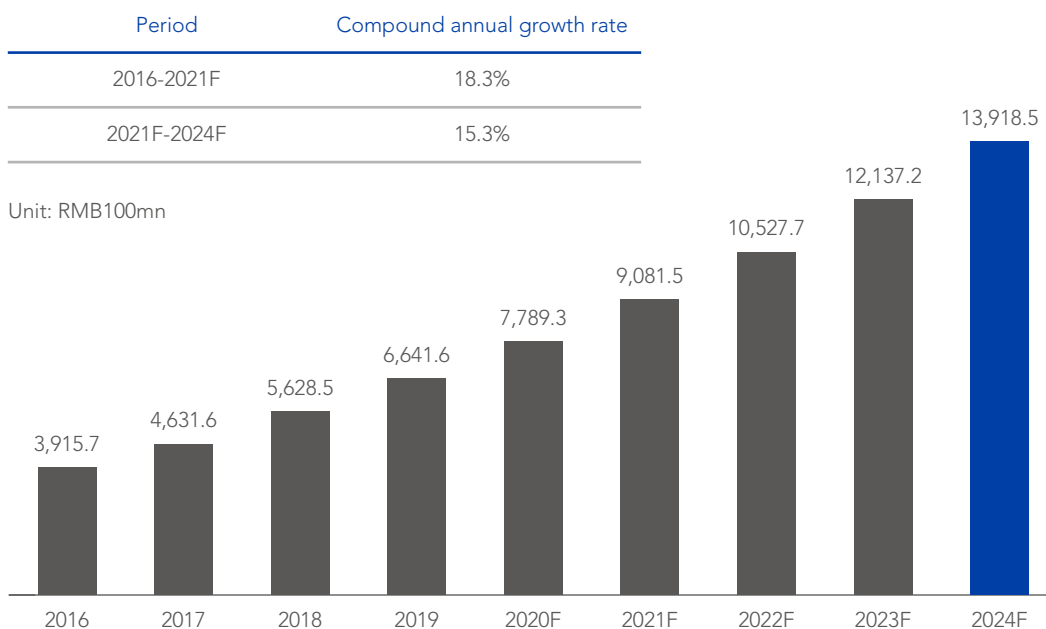
Outlook for 2022: as the risk of uncertainty in the rate of reduction of drugs due for renewal decreases, while the price reduction of drugs negotiated for new indications tends to stabilize, the rules of NRDL negotiations are gradually completing the next loop. A number of exclusive varieties due for renewal in 2022 are expected to participate in the national negotiations, which will also continue to drive the development of the innovative drug market.

2.1.2 Medical device-related hard technology

2.1.2.1 Market overview: In 2021, the market was estimated to be RMB910bn, with an expected compound annual growth rate of about 15% in the next 3 years. The domestic substitution of high-end equipment and innovative consumables is improving.

With the development of China's economy, the improvement of people's economic level, and the government's strong support for innovative medical devices, the medical device market in China has grown rapidly from about RMB310bn in 2015 to about RMB910bn in 2021, a compound annual growth rate of about 18%. With the future improvement of market demand and the industrial upgrading brought by the technological development of the medical device industry, the medical device industry is expected to continue to maintain its growth trend (with a compound annual growth rate of about 15%), gradually realizing the import substitution from low-end products to high-end products, and further expanding the size and product categories to go overseas.

Figure 12 Market size of China's medical device market and forecast, 2016–2024F



Source: United Imaging Prospectus, HTI

2.1.2.2 Development trends: from agency to originality, from low-end to high-end, from home to abroad, focusing on medical device-related hard technology and globalization opportunities

China's medical device industry has developed 40 years, from agency to originality, and from low-end to high-end. At present, R&D innovation has become the core of the development of China's medical device industry.

From home to abroad, the proportion of overseas income increased. During 2016–2021, the proportion of overseas income of listed medical device was increased, from 23.1% to 39.2%. Under the pressure of domestic centralized procurement and the impact of overseas epidemic, Chinese enterprises pay more attention to overseas markets, and the proportion of overseas income has been increasing since 2019. In 2021, the overseas income of the pharmaceutical and biological industry totaled RMB253.3bn, a year-on-year increase of 22.2%. The industries with a relatively high proportion were CXO, medical devices and APIs. All are areas with comparative advantages in China, among which the overseas income of medical devices was RMB99.3bn, making it the field with the largest overseas income in the pharmaceutical sector, with a year-on-year increase of 19.6%.

Figure 13 Increased proportion of overseas income of domestic medical devices

	Overseas revenue share (%)						Overseas revenue (RMB100mn)						YoY (%)
	2016	2017	2018	2019	2020	2021	2016	2017	2018	2019	2020	2021	2021
Pharmaceutical													
biology	7.6%	7.8%	7.5%	7.4%	10.4%	11.2%	846	1065	1222	1355	2073	2533	22.2%
Chemical													
pharmaceutical	14.6%	14.9%	15.1%	14.2%	17.6%	17.4%	415	517	643	675	819	888	8.4%
> APIs	35.7%	31.4%	33.3%	31.3%	41.1%	35.1%	174	212	273	279	376	370	-1.6%
TCM	1.2%	1.3%	1.3%	1.2%	1.4%	1.3%	27	32	39	39	44	43	-4.0%
Biological products	23.2%	19.7%	10.1%	6.0%	4.3%	12.3%	123	136	85	55	42	172	308.5%
Pharmaceutical													
commercial	0.2%	0.4%	0.4%	0.4%	0.4%	0.3%	9	20	23	26	32	24	-23.8%
Healthcare services	24.5%	23.1%	24.4%	27.7%	29.9%	30.6%	109	143	183	238	306	414	35.2%
> CXO	70.9%	70.4%	66.3%	67.9%	68.8%	66.7%	106	131	159	213	288	390	35.6%
Medical devices	23.1%	23.1%	22.0%	24.7%	39.2%	39.3%	162	216	249	322	830	993	19.6%
> Medical													
equipment	20.9%	20.5%	20.6%	27.9%	35.8%	32.2%	66	82	95	140	234	240	2.7%
> Medical													
consumables	36.8%	38.0%	35.0%	33.7%	50.1%	50.3%	79	110	124	147	393	420	7.0%
> In vitro diagnostics	9.6%	9.8%	9.5%	9.5%	29.8%	35.1%	16	24	30	35	203	332	63.8%

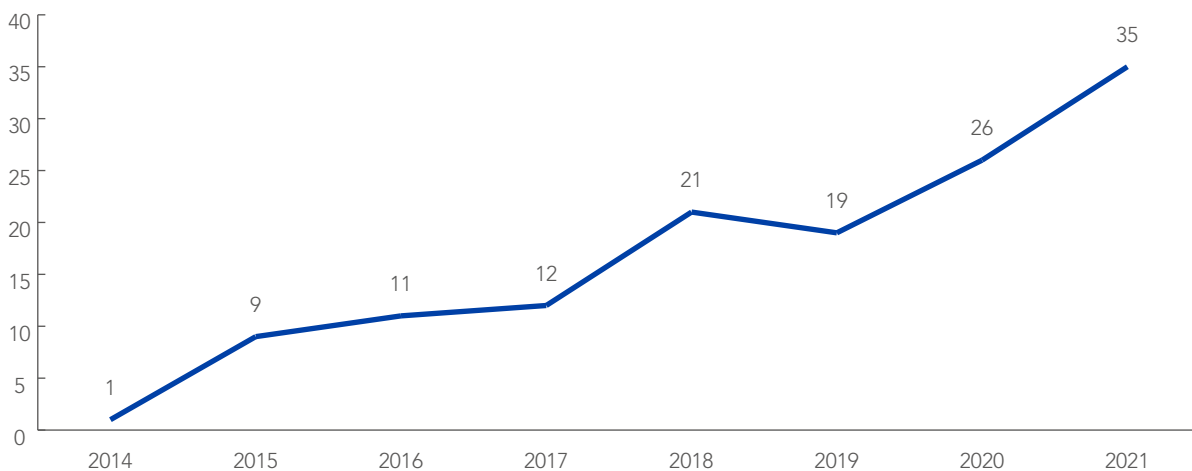
Source: Wind, HTI

II. Opportunities in the next decade

2.1.2.3 Policy development: encourage innovation and import substitution, pay attention to industries active in technological innovation and import substitution process.

Encourage innovation: special approval of innovative devices, Marketing Authorization Holder (MAH), etc., aiming to promote the development of innovative devices. Since the implementation of the *National Medical Products Administration's Special Approval Procedure for Innovative Medical Devices (Trial)* in 2014, by the end of December 2021, a total of 134 innovative devices had been approved, of which the number of innovative devices approved in 2021 reached 35. It was higher than 2019–2020 with 19 and 26 innovative devices approved. In 2021, the Regulation on Supervision and Administration of Medical Devices pointed out that medical device registrants and filers are allowed to produce medical devices, or entrust enterprises that meet the regulations and have conditions to produce medical devices, which has brought new opportunities for the innovation and development of the medical device industry.

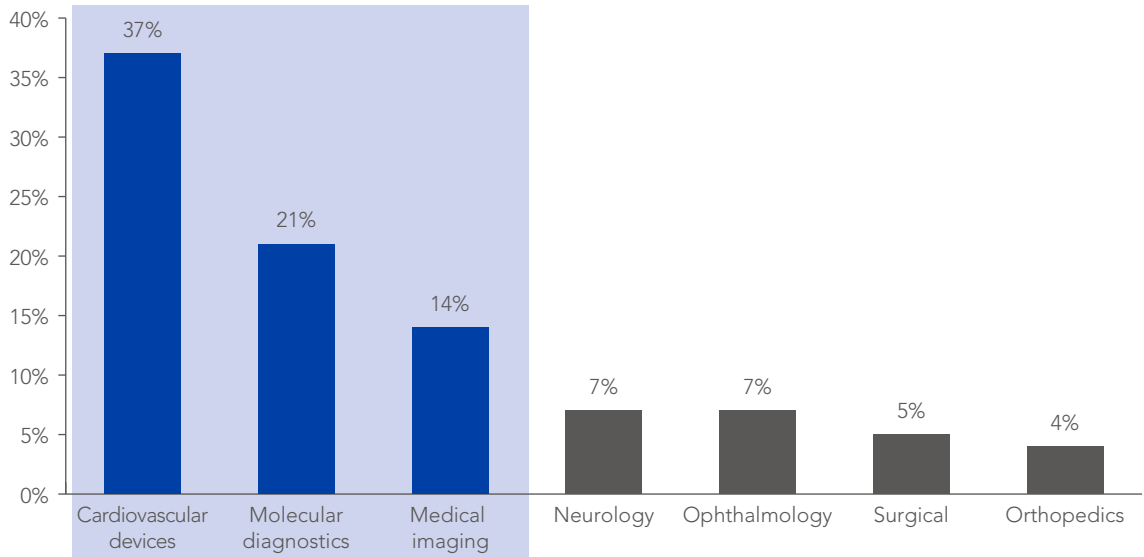
Figure 14 The number of approved innovative devices hit a new high in 2021



Source: National Medical Products Administration, HTI

Encourage innovation: China is active in the innovation of cardiovascular, molecular diagnostic and medical imaging fields. From the perspective of the activeness of innovation, since the kickoff of the national special review procedure for innovative medical devices in 2014, most of the approved innovative devices approved are for cerebrovascular and cerebrovascular diseases, molecular diagnostic and medical imaging, accounting for 37%. Specifically, molecular diagnostic and medical imaging account for 21% and 14% respectively, and other fields include neurology (7%), ophthalmology (7%), surgery (5%) and orthopedics (4%).

Figure 15 Most of the approved innovative medical devices are for cardiovascular and cerebrovascular diseases, molecular diagnosis and imaging



Source: National Medical Products Administration, HTI

Equipment + consumables: the volume-based purchasing related policy encourages import substitution. Since 2022, Chinese provinces have issued specific implementation-related documents to encourage import substitution. The import substitution policy has been implemented from the aspects of preferential purchase of domestic products, restricted purchase of imported products and import tariff etc.

Figure 16 Policies related to domestic substitution

Release date	Issuing agency	Policy name	Policy focus
January 2021	Guangdong Provincial Department of Finance	Matters on the Optimized Management of Provincial Government Procurement of Imported Products	If it is necessary to procure imported products, the following three points must be met: 1. not available in China; 2. procured for use outside China; 3. similar products domestically produced in China cannot meet the substantial demand.
February 2021	Zhejiang Provincial Department of Finance	Unified Argument List of Imported Products in the Provincial Government Procurement in 2021 2022 (Medical Equipment Category)	The list of imported medical equipment can be included went down to 195 from 215 in the 2019 2020 list. Among them, the equipment used for pathological diagnosis, including section scanners and paraffin section machines, were moved out of the import list this year.

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Release date	Issuing agency	Policy name	Policy focus
March 2021	Guangdong Health Commission	Disclosure of the List of Imported Products for Provincial Health and Health Institutions in 2021	The number of imported medical equipment that can be procured plummeted to 46 from 132 in 2019.
	General Office of the State Council	Guiding Opinions on Promoting Healthy Development of Pharmaceutical Industry	If domestic drugs and medical equipment can meet the requirements, the government procurement projects in principle must purchase domestic products and it is a must to gradually improve the level of allocation of domestic equipment in public medical institutions.
	Guangzhou Municipal Bureau of Finance	Optimizing the Management of Government Procurement of Imported Products	To procure imported products, it is a must to demonstrate the comparison between the imported products and domestic ones. If the proposed imported products are similar to domestic products in China but cannot meet the substantive needs, in addition to providing mandatory materials, it is also necessary to provide the comparison of the similar domestic products and imported products in technical parameters, functionality and other aspects, as well as the minutes and records of the deliberations and decisions on matters.
April 2021	Sichuan Provincial Department of Finance	Disclosure of Demonstration of the List of Imported Products in the 2021 2022 Provincial Government Procurement (Medical and Health Equipment Category)	Only 59 types of medical equipment can be directly procured overseas, meaning that in addition to the list of equipment, domestic medical equipment must be used.
May 2021	Hangzhou Municipal Bureau of Finance	Circular on Standardizing the Management of Government Procurement of Imported Products	If there are similar domestic alternative products or similar imported products have been procured to meet the corresponding demand, no procurement of imported products can be made in principle. Provide that the total amount of government procurement of imported products in three years from 2021 must have an average annual decline of more than 10%. Encourage and support purchasers to give priority to the procurement of products identified as the first set of products and "manufacturing excellence" of independent innovation products.
	Ministry of Finance, Ministry of Industry and Information Technology	Guidance Standards for Government Procurement of Imported Products (2021 Edition)	137 kinds of medical devices must be procured domestically: of 12 kinds of medical devices, 75% procured domestically; of 24 kinds of medical devices, 50% domestically; of 5 kinds of medical devices, 25% domestically.
	Shaanxi Provincial Health Commission	Administrative Measures for Government Procurement of Imported Products by Budget Units (for Trial Implementation)	To procure imported products for medical use, the approval will be more stringent: each unit need to declare and go through the expert evidence, online disclosure, departmental centralized demonstration, financial approval and implementation in advance.

Release date	Issuing agency	Policy name	Policy focus
June 2021	Guangdong Provincial Drug Administration	Interim Administrative Provisions of Guangdong Province on the Clinical Urgency of Imported Drugs and Medical Devices in Hong Kong and Macao Bay Area (Draft)	Even if the clinical urgency, there are only three special circumstances under which import is available: (1) not approved for registration in mainland China; (2) registered products cannot be replaced; (3) the hospital once purchased for the clinical urgency and has advanced clinical applications. After the application, expert verification is required and only valid for one year.
June 2021	Kunming Finance Bureau	Circular on Matters Relating to the Approval of Government Procurement of Imported Products	For products that are not available in China or cannot be obtained on reasonable commercial terms, they can be imported; before applying for procurement, the purchaser must well conduct market research on the proposed imported products, compare the outstanding performance differences of more than three representative similar products on the market and formulate a market research report.
December 2021	Ministry of Industry and Information Technology, Ministry of Finance, General Administration of Customs, State Taxation Administration, National Energy Administration	Circular on the Adjustment of the Relevant Catalogue of Tax Policy on the Import of Major Technical Equipment	After 2022, the medical equipment that can enjoy duty free policy has been reduced to 8 kinds, further favoring domestic medical equipment into the hospital.
December 2021	National Development and Reform Commission, the Ministry of Commerce	Special Administrative Measures for Foreign Investment Access (Negative List) (2021 Version) and Special Administrative Measures for Foreign Investment Access Prohibition in Free Trade (Negative List) (2021 Version)	Prohibit foreign investment in "human stem cells, gene diagnosis and treatment technology development and application", "medical institutions are limited to joint ventures".

Source: Qianzhan Industry Research Institute, HTI

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Equipment: The import substitution rate of low-end products is high, and the import substitution of high-end products is improving. In the past, the development level of medical equipment in China was low. Most medical equipment, especially large medical equipment, was heavily dependent on imports. With the deepening of healthcare reform foreign advanced technologies have been introduced successively, and China's medical equipment manufacturing technology has made significant breakthroughs, enhancing localization in the small and medium-sized medical equipment market. With a number of policies issued by the state in recent years to encourage the innovation of domestic medical devices, China has also made improvement in the field of large equipment. As a result, a number of excellent domestic brands have emerged and also took a position in the global market.

Figure 17 Comparative analysis of the localization rates of some medical equipment

Sub-segments	Market size in 2019 (RMB100mn)	Domestic substitution rate (amount)
Monitor	30	70%
Defibrillator	12	55%
DR	80	25%
Ultrasound	91	40%
Gene sequencer	42	25%
MRI	101	17%
CT	116	27%
PET	24	40%
DSA	40	15%
Robotic laparoscopic surgery system	5	0%
linear accelerator	43.8	9%

Source: Neusoft Medical Prospectus, Our United Group Prospectus, MedBot Prospectus, HTI

Equipment: The import substitution progress is developing from low-end to high-end. Take ultrasound as an example. The domestic low-end ultrasound account for a high proportion currently, and the proportion of the high-end ultrasound is increasing. During 2017–2019, the market shares of domestic enterprises in the middle and high-end ultrasonic field continued to expand, which showed that the progress of import substitution developed from low-end to high-end, and the enterprise innovation ability and technical level continued to improve.

Figure 18 The domestic low-end ultrasound account for a high proportion, while the proportion of the high-end ultrasound is increasing.

Change of Top 5 brands in the market share of high end ultrasound

2017		2018		2019H1	
Brand	Market share	Brand	Market share	Brand	Market share
GE	34.93%	GE	36.29%	GE	33.80%
Philips	29.85%	Philips	29.86%	Philips	30.98%
Siemens	8.96%	Hitachi	8.14%	Shenzhen Mindray	7.58%
Hitachi	6.57%	CANON	6.61%	Siemens	7.07%
CANON	5.37%	Siemens	6.15%	Hitachi	6.94%

Changes of Top 5 brands in the market share of mid range ultrasound

2017		2018		2019H1	
Brand	Market share	Brand	Market share	Brand	Market share
GE	23%	GE	20.70%	GE	24.77%
Philips	17.42%	Shenzhen Mindray	19.53%	Shenzhen Mindray	21.30%
Shenzhen Mindray	16.72%	Philips	19.53%	Philips	16.78%
Hitachi	9.41%	Hitachi	7.63%	Hitachi	7.99%
Siemens	6.97%	Siemens	6.12%	Siemens	5.44%

Change of Top 5 brands in the market share of low end ultrasound

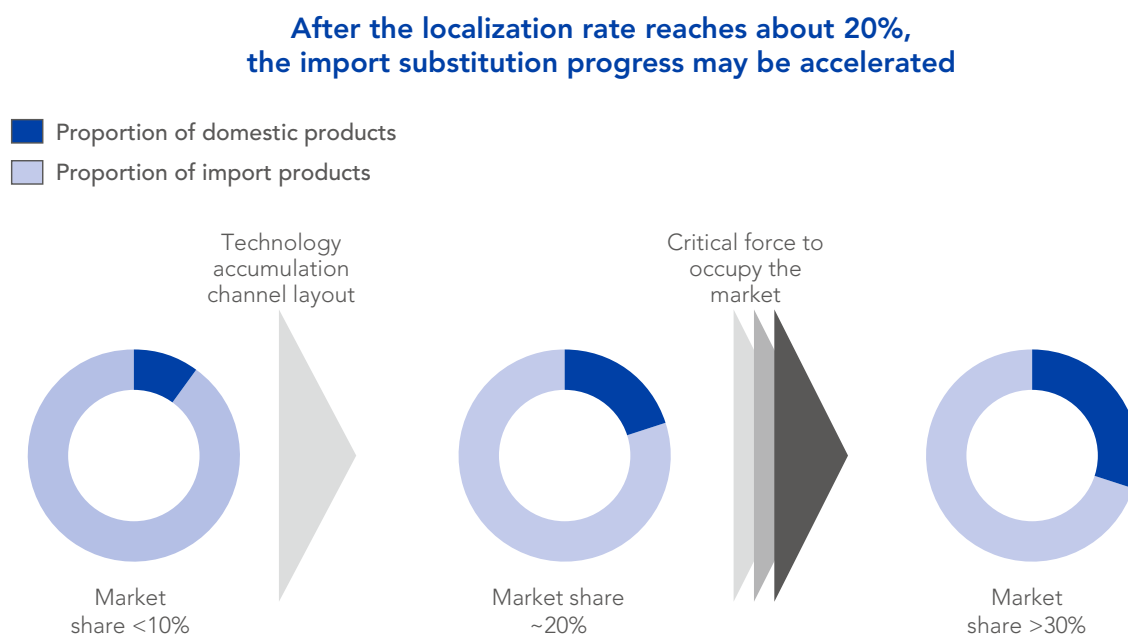
2017		2018		2019H1	
Brand	Market share	Brand	Market share	Brand	Market share
Shenzhen Mindray	54.18%	Shenzhen Mindray	28.95%	Shenzhen Mindray	39.68%
Shenzhen SonoScape	28.64%	Shenzhen SonoScape	13.74%	Shantou Ultrasound	7.98%
VINNO Technology	2.76%	Guangdong Goworld	11.11%	Shenzhen SonoScape	7.27%
GE	2.17%	GE	8.05%	GE	7.27%
Wuxi Haiying	1.38%	Philips	5.58%	Philips	5.61%

Source: Medical Bidding and Procurement Network, HTI

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Equipment: the substitution progress will be accelerated when the localization rate reaches 20%. Reviewing the history of import substitution, if the domestic proportion of a certain kind of equipment reaches 20%, the substitution process might be accelerated. The process of 0–10% localization rate is often the process of technology accumulation and channel layout. Once the domestic proportion reaches the critical range of about 20%, it means that the domestic technology and channel of the variety have owned a good foundation. Under the impact of the external catalysis (policies, etc.), the penetration might be accelerated, and may progress to 20% and > 50% quickly.

Figure 19 After the localization rate reaches about 20%, the import substitution progress may be accelerated



Source: HTI

Consumables: The category and scope of consumables are constantly expanding, and domestic products have cost advantages, which is conducive to improving the market share of domestic products. In 2018, the National Centralized Drug Procurement (NCDP) started. Since then, the category and scope of consumables enter into centralized procurement have been continuously expanded. In 2021, a large variety of consumables such as COVID-19 reagent, pacemaker, coronary balloon and stapler were selected, which is conducive to the improvement of the market share of domestic products.

Figure 20 The category and scope of consumables for centralized procurement are constantly expanding

Date	Regions involved	Required submissions	Centralized procurement categories
April	Guangdong, Jiangxi, Henan, Hunan, Guangxi, Hainan, Chongqing, Guizhou, Yunnan, Gansu, Qinghai (municipalities directly under the Central Government and autonomous regions)	Circular on Well Developing the Volume Based Procurement and Use of 2019 cCoV Testing Reagents by the Alliance Regional Groups	COVID 19 detection reagents
July	Anhui Province	Circular of Anhui Province Medical Security Bureau office on 2021 Province Centralized Procurement of B Large Medical Equipment	Bone plate and supporting screws, intramedullary nails and accessories, hollow (hollow) screws and other medical equipment
September	Led by Henan Provincial Medical Insurance Bureau and participated by twelve provinces (autonomous regions and municipalities directly under the Central Government) including Shanxi, Jiangxi, Hubei, Chongqing, Guizhou, Yunnan, Guangxi Zhuang Autonomous Region, Ningxia Hui Autonomous Region, Qinghai, Hunan, Hebei	Circular on Implementing the Results of Centralized Volume Based Procurement of Orthopedic Trauma Medical Consumables in 12 Provinces (Autonomous Regions and Municipalities Directly under the Central Government)	Bone plate and supporting screws, intramedullary nails and accessories, hollow (hollow) screws and other medical consumables
October	Shaanxi, Gansu, Ningxia, Xinjiang, Xinjiang Construction Corps, Hunan, Guangxi, Hainan and other provinces (regions, corps)	Implementation Plan for the Centralized Volume Based Procurement of Cardiac Pacemakers by Interprovincial Alliance in Provinces (Autonomous Region, Production and Construction Corps)	Cardiac pacemakers
	Jiangsu, Shanxi, Fujian, Hubei, Hunan, Hainan, Chongqing, Guizhou, Yunnan, Gansu, Xinjiang Uygur Autonomous Region, Xinjiang Production and Construction Corps	Announcement on Volume Based Procurement of Coronary Drug Coated Balloon by Interprovincial Alliance	Coronary drug coated balloons
November	17 provinces (municipalities directly under the Central Government and autonomous regions) including Beijing, Tianjin, Hebei, Heilongjiang, Jilin, Liaoning, Jiangxi, Hubei, Guangxi, Shandong, Shaanxi, Sichuan, Inner Mongolia, Gansu, Ningxia, Qinghai, Tibet	Work Program for the Volume Target Procurement and Use of "3 + 14" Anastomosis Medical Consumables in Beijing, Tianjin and Hebei	Anastomosis class medical supplies, specifically for the tube type/end end anastomosis, hemorrhoid anastomosis two types, nail material for titanium alloy or pure titanium
	Sichuan, Ningxia, Shanxi and other places	Circular on the development of some oral high value medical consumables product information collection work	Fill in the scope of the oral implant system, specifically including implants, restorative abutments, implant restoration accessories (including healing abutments, covering screws, transfer bars, scanning bars, replacement bodies, restoration abutments, abutment screws, abutment protection caps, temporary abutments), etc.

II. Opportunities in the next decade

Date	Regions involved	Required submissions	Centralized procurement categories
December	Henan Province	Announcement of the Results for the 2021 Centralized Volume Target Procurement by Union of Public Medical Institutions in Henan Province	Hemostasis, anti adhesion, dural spinal membrane and other high value medical consumables with high prices and strong public feedback
	Shandong, Shanxi, Hebei, Henan	Circular on Disclosing the Proposed Enterprises and Products in Centralized Volume Target Procurement of High value Medical Consumables by Shandong, Shanxi, Hebei and Henan Alliance	Vascular intervention class pressure pump, vascular intervention class retrievable vena cava filter, inguinal hernia patch, incision protector and single use non absorbable polymer ligature clip (vascular ligature clip)

Source: Qianzhan Industry Research Institute, HTI

2.2 Brand-driven: Healthcare services, consumer healthcare, traditional Chinese medicine

2.2.1 Healthcare services and consumer healthcare

2.2.1.1 Market overview: Healthcare service: in 2021, the market size was estimated to be RMB910bn, with an expected compound annual growth rate of about 13% in the next 3 years. The state continued to encourage the development of private hospitals, and the first terminal private force emerged

In 2021, the market size of China's Healthcare service track was estimated to be RMB910bn, with an expected compound annual growth rate of about 13% in the next 3 years. Specifically, the Oncology Healthcare service market size was the largest, about RMB454.5bn, with a compound annual growth rate of about 12% in the past 3 years. Ophthalmology, dental care, TCM clinics and hair transplants hospitals or organizations were growing rapidly, with market sizes of about RMB166.5bn, RMB145bn, RMB100bn and RMB16.9bn respectively.

The state encouraged the development of private hospitals. Non-public hospitals have always been positioned as an efficient supplement to public hospitals and working together to expand the supply of medical resources. Encouraging private hospitals is reflected in the State Council's key tasks to deepen the medical and health system every year. Under the increasing trend of medical service price and medical staff salary, the value attribute of medical service labor is expected to keep rising, and the first terminal private force is emerging.

Figure 21 Overview of market size, growth rate and driving forces of the segments of healthcare services

Healthcare service track	Size	Market size	2019–2021 CAGR	Core drivers of growth
Oncology	China's oncology hospital service market size in 2021	RMB454.5bn	12%	Tumor incidence growth
Ophthalmology	China's ophthalmic medical services market size in 2021	166.5bn	15%	Youth myopia prevention and control, adult demand for lens removal, cataract and presbyopia treatment for the elderly
Dental care	China's oral health care services market size in 2021	RMB145bn	15%	Consumption upgrade, oral awareness enhancement
TCM clinics	China's TCM clinics services market size in 2021	RMB100bn	15%	Chronic disease prevalence grows and people have increasing health awareness and demand
Assisted Reproduction	China assisted reproduction services market size in 2021	RMB33.6bn	5%	Increase in infertility rate, assisted reproduction penetration rate
Hair transplant	China hair transplantation medical service market size in 2021	RMB16.9bn	23%	Increase in penetration rate, increase in the penetration rate of conservation business and repurchase rate

Source: Wind, HTI

2.2.1.2 Business model: Healthcare service: brand-driven, the brand creates sustainable terminal value, focusing on business model and brand power

Healthcare service has sustainable terminal value. Due to the specialness of healthcare services, most of the diagnosis and treatment processes need to be completed offline. For patients, healthcare services provide them with solutions, and different healthcare products are one of the options. The major innovations in healthcare services involve various examination methods, innovative medical device and surgical procedures. As the scenarios of interaction between doctors and patients has not fundamentally changed with the innovation of medical device, healthcare service has sustainable terminal value.

Healthcare service platforms have great value. It takes a long time to cultivate a healthcare service brand. Once the brand is established, each healthcare service scenario has the value of patient entrance, serving as a platform to upgrade various services.

The Healthcare expenses have the possibility of sustainable growth. With the upgrading of innovative device, drugs and other products, economic development and payment innovation have improved the accessibility of innovative medical device, and the healthcare expenses have the possibility of sustainable growth.

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Figure 22 Analysis of the business model of healthcare service segments

	Ophthalmology	Hair transplant	Dental	Medical examination	Oncology	Assisted Reproduction	Traditional Chinese Medicine (TCM)	Rehabilitation medical
Threshold	High threshold: capital, equipment, doctors, etc.	Lower threshold	Lower threshold for single-site clinics, higher threshold for high-grade hospitals	Medium threshold: capital, equipment, etc.	High threshold, large capital expenditure, multi-disciplinary support required	High threshold, with license barriers	Medium threshold for single-site clinics, relying on physician resources	Higher threshold: doctors, equipment, medical insurance qualification, etc.
Talent dependence	Higher requirements for doctors in glaucoma and optometry and lower reliance on doctors in refractive optometry	Relatively low requirements for doctors	High reliance on doctors' technical level, partial to manual work attributes	High reliance on ultrasound doctors and average reliance on others	Reliance on leading specialists and need for multidisciplinary talent support	Dependence on leading specialists	High reliance on doctors, reliance on famous TCM doctors in early customers attraction and shortage of senior TCM doctors	Dependence on doctors for critical care rehabilitation and sports rehabilitation and general dependence on doctors for elderly rehabilitation
Sales model	B2C	B2C	B2C	B2B+B2C	B2C	B2C	B2C	B2C
Core competence	Brand+doctor+supply chain+graded chain	Brand	Regional brand+doctor+supply chain	Brand+supply chain+service optimization	Regional brand + doctor	Regional brand + doctor + service optimization	Doctor + brand + supply chain realization	Critical care rehabilitation: customers from public hospital departments + equipment + doctors + medical insurance
Growth sustainability	Strong profit sustainability	Continuously open stores and good sustainability of nurturing business	Single core hospital has good profit sustainability	High growth driven by continuous store opening and structural optimization	Single core hospital has good profit sustainability	Single core hospital has good profit sustainability	Continued store opening and high profit sustainability after forming brand effect	Rapid single-store ramp-up, average growth after reaching peak and relying on expansion
Replicability	Strong standardization and replicability, with obvious scale advantage	Strong standardization and replicability	Regional attributes are obvious and standardization and replicability are difficult	Standardized and strong replicability, with certain scale advantage	Difficult to standardize	Have the basis of standardization and replicability is strong	Not easy to rely on doctors to standardize in the early stage and strong replicability after the brand is made available	Stronger, with the basis of standardization (equipment + doctors)
Competitive landscape	More competitive	Competition is fierce	Competition is fierce	More competitive	Better competition pattern	Better competition pattern	Better competition pattern	Better competition pattern
Future highlights	Category expansion + grading expansion penetration + industry chain extension	Hair transplant penetration increase + expansion of female customers + increase in repeat and penetration rate of the maintenance business	Provincial replication + category expansion + non-medical process optimization	Scale effect + platform + consolidation of brand	Expansion to sink county markets	Nationwide expansion + concentration by leading players	Continuous policy support for TCM development + continuous expansion of chain operation	Rapid replication after single-store model works
Risks and bottlenecks	Future regional competition may intensify, ophthalmic surgery technology risk may grow	Single store in single city and high penetration rate	Difficult to expand in other provinces, over-reliance on Hangkou General Hospital	Strong competitive pressure in the future and brand strength needs to be cultivated continuously	Difficult to expand and more efforts to cultivate talents	Slow growth rate of the industry, decreasing willingness to give birth	No doctor ownership (practicing in several places) and revenue is mainly sourced from drugs	High percentage of medical insurance; average growth of single store

	Ophthalmology	Hair transplant	Dental	Medical examination	Oncology	Assisted Reproduction	Traditional Chinese Medicine (TCM)	Rehabilitation medical
Market share of private hospitals	18.6%	85%	39.9%	20.3%	9%	/	/	/
Market size	RMB130.8bn (2020)	RMB16.9bn	RMB112bn	RMB197.8bn (2019)	RMB405.6bn	RMB33.6bn	RMB100bn	RMB103.2bn
Growth rate in the next 5 years	15%	23%	15%	15%	12%	8%	15%	15-20%

Source: annual corporate reports, Wind, HTI

2.2.1.3 Business model: consumer healthcare: great items create great companies, with both consumer and medical attributes, paying attention to segments with strong consumption attributes

During the past 20 years, a large number of U.S. consumer healthcare companies have driven high growth through successful product categories, such as DEXCOM's dynamic blood glucose monitor, Align Technology's invisible orthodontic aligners and EXACT SCIENCES's colorectal cancer early screening kit.

The development of consumer healthcare in China benefits from its large population base; on the other hand, China is still on the track of consumption upgrading, and its consumption habits have not yet been stabilized. Therefore, the consumer healthcare industry has high potential to develop.

Figure 23 Selected list of US-listed consumer healthcare companies and analysis of their core business

Company name	Core business
DEXCOM	Device: Continuous glucose monitoring
ALIGN TECHNOLOGY	Device: invisible orthodontic aligners
INSULET	Device: insulin pumps
EXACT SCIENCES	Device: early screening for colorectal cancer
COOPER	Devices: optometry and contact lenses

Source: Wind, HTI

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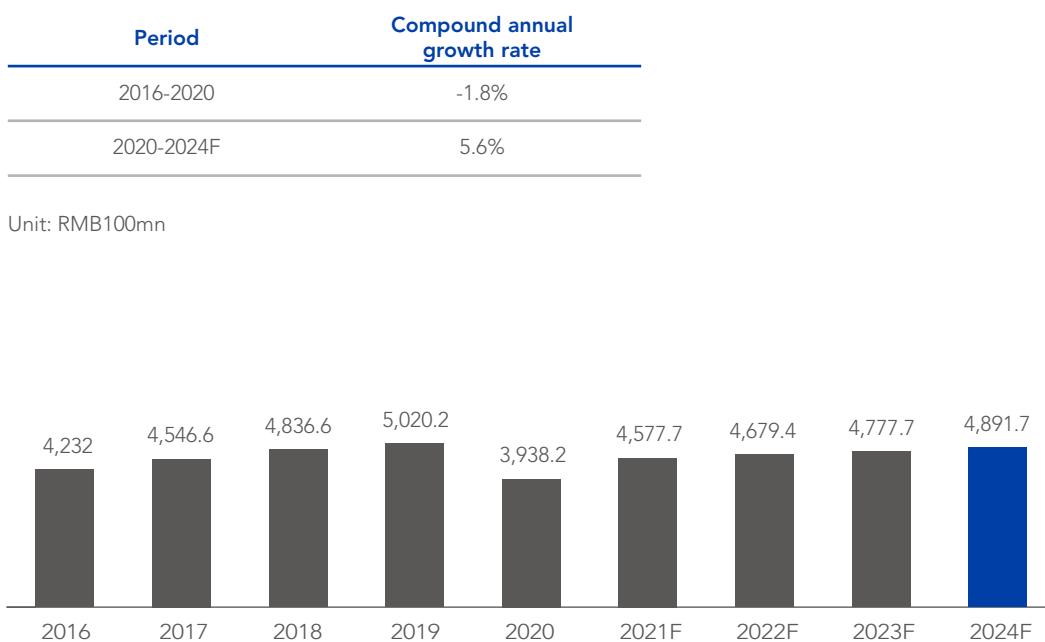
2.2.2 Traditional Chinese Medicine (TCM)

2.2.2.1 Market overview: in 2021, the market size was estimated to be RMB450bn, with an expected compound annual growth rate of about 6% in the next 3 years. The market has high attention from residents, high acceptance, and a stable consumer base

The market size of TCM in China will be approximately RMB457.77bn in 2021 and is expected to grow at a CAGR of approximately 6% over the next three years. Affected by the COVID-19 epidemic in 2020, the number of hospital out-patients dropped sharply. The TCM industry is expected to restore with the gradual normalization of the prevention and control of the epidemic and the recovery of hospital outpatient business.

TCM has a long history, profound influence and a stable consumer base. According to the Survey Report on Public Awareness of Traditional Chinese Medicine issued by the National Administration of Traditional Chinese Medicine. Public awareness of TCM has the characteristic of “three highs” in China: First, high attention. In the survey, 90% of the people pay attention to the development of TCM, and 30% often pay attention to TCM; second, high contact. 88% have been exposed to Chinese medicine; third, high acceptance. 53% will first consider TCM or a combination of TCM and western medicine, and 89% are willing to accept TCM services. The characteristics of “three highs” show that Chinese medicine has a stable consumer base.

Figure 24 Market size of China’s TCM market and forecast, 2016–2024F



Unit: RMB100mn

Source: Gushengtang Prospectus, OPM Prospectus, HTI

2.2.2.2 Business model: brand-driven, big companies keep expanding, focusing on the pricing power and trend of TCM resources

Pricing power and brand power of TCM resources: TCM confidential formula are currently the highest level of protection for TCM in China, and their prescriptions, dosages, and preparation methods are kept confidential. Enterprises offering such products are resource-based enterprises of TCM products, including Pien Tze Huang, YUNNAN BAIYAO, Tong Ren Tang, Dong-E-E-Jiao, etc. The characteristics of the leaders in such enterprises are as follows: 1) limited core formula resources, relatively abundant upstream resources available to the companies, and relatively controllable production capacity; 2) stable end-user demand, a loyal user base, relatively low price sensitivity, simultaneous rise in product volume and price.

For such enterprises, the core concerns are as follows: 1) Enterprises with stronger brand power have higher value (TCM companies with “Chinese time-honored brands”, listed as intangible cultural heritage, and exclusive varieties have stronger brand power) and thus have greater bargaining power for both upstream and downstream; 2) ex-factory price increases not entirely driven by cost, the incremental profit will be retained by the enterprises or shared with the dealers, which will accelerate the user’s adaptation to the price adjustment; 3) consumption upgrade improves industry prosperity. For example, Pien Tze Huang, high-priced, has high-end gift attributes in addition to liver protection effects. Tongrentang imperial wine, and Yunnan Baiyao toothpaste are the extension of brand and effect, which can foster new areas of business growth for enterprises.

2.2.2.3 Development trends: policies encourage the inheritance of Chinese medicine and the development of the TCM industry

In the past 20 years, the State has continuously issued favorable policies related to TCM in an effort to support the production of TCM materials, the inheritance and innovation of TCM, the building of TCM service system as well as the payment side of TCM. At the same time, the State has also continuously introduced policies to regulate the industry, and issued detailed rules on the registration of TCM, quality standards of TCM materials, and TCM formula granules. The State has long encouraged the inheritance of TCM and the development of the TCM industry.

Figure 25 Review of positive and normative policies for the TCM industry

April 2000	Circular on Matters Relating to Strengthening the Registration Management of Chinese Medicine	Rules
December 2007	Basic Technical Requirements for Injection of Chinese Medicines and Natural Medicines	Rules
February 2009	Circular on Releasing the Guiding Principles for the Protection of Varieties of Traditional Chinese Medicine	Favorable
May 2009	Several Opinions of the State Council on Supporting and Promoting the Development of Chinese Medicine	Favorable
January 2009	Circular on the Re-evaluation of the Safety of Chinese Medicine Injectables	Rules
October 2010	Circular on Releasing 7 Technical Guidelines on the Evaluation of Safety Re-evaluation of Chinese Medicine Injections, including the Evaluation of Production Processes	Rules

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January 2011	Three Departments Guide to Strengthen the Supervision and Management of Chinese Medicinal Pieces	Rules
January 2012	Circular on the Pilot Construction of Traceability System for the Circulation of Traditional Chinese Medicines	Rules
June 2012	Announcement on the 2012 National Projects to be Supported for the Production of Chinese Materia Medica	Favorable
November 2013	Circular on Further Strengthening the Management of Chinese Materia Medica	Rules
July 2015	Announcement on the Self-checking and Verification of Drug Clinical Trial Data Plan for the Protection and Development of Chinese Materia Medica (2015–2020)	Rules
April 2015		Favorable
February 2016	Outline of the Strategic Plan for the Development of Chinese Medicine (2016–2030)	Favorable
August 2016	Technical Requirements for Quality Control and Standard Formulation of Chinese Herbal Formula Granules (Draft for Comments)	Rules
February 2016	The Development of Chinese Medicine during the Thirteenth Five-Year Plan Period	Favorable
December 2017	Opinions on Deepening the Reform of the Review and Approval System to Encourage Innovation in Pharmaceuticals and Medical Devices	Favorable
October 2017	Quality Management Standards for the Production of Traditional Chinese Medicines (Revised Draft)	Rules
December 2017	Guiding Opinions on Promoting the Integrated Development of Chinese Medicine Health Services and the Internet	Favorable
December 2017	Interim Administrative Measures for Funds of the “Hundred Million” Talent Project for the Inheritance and Innovation of Chinese Medicine	Favorable
June 2018	Code of Practice for Chinese Medicine Health Care Services (for Trial Implementation)	Rules
August 2018	Special Rectification Plan for Chinese Medicine Tablets	Rules
August 2018	Several Opinions on Strengthening the Work of Ethnic Minority Medicine in the New Era	Favorable
September 2018	Regulations on the Protection of Varieties of Traditional Chinese Medicine	Rules
December 2018	Construction Plan for National Daodi Herbs Production Bases (2018–2025)	Favorable
July 2019	Circular on Practically Strengthening the Chinese Medicine Related Work in the Construction of Medical Consortia	Favorable
October 2019	Opinions on Promoting the Development of Traditional Chinese Medicine Inheritance and Innovation	Favorable
November 2019	Disclosure on the Uniform Standards for Pilot Varieties of Chinese Medicine Formulas	Favorable
February 2020	Special Rectification Plan for Chinese Medicine Tablets	Rules
September 2020	Circular on Promoting the Construction and Management of Classical Chinese Medicine Wards in Key TCM Hospitals of the TCM Inheritance and Innovation Project	Favorable

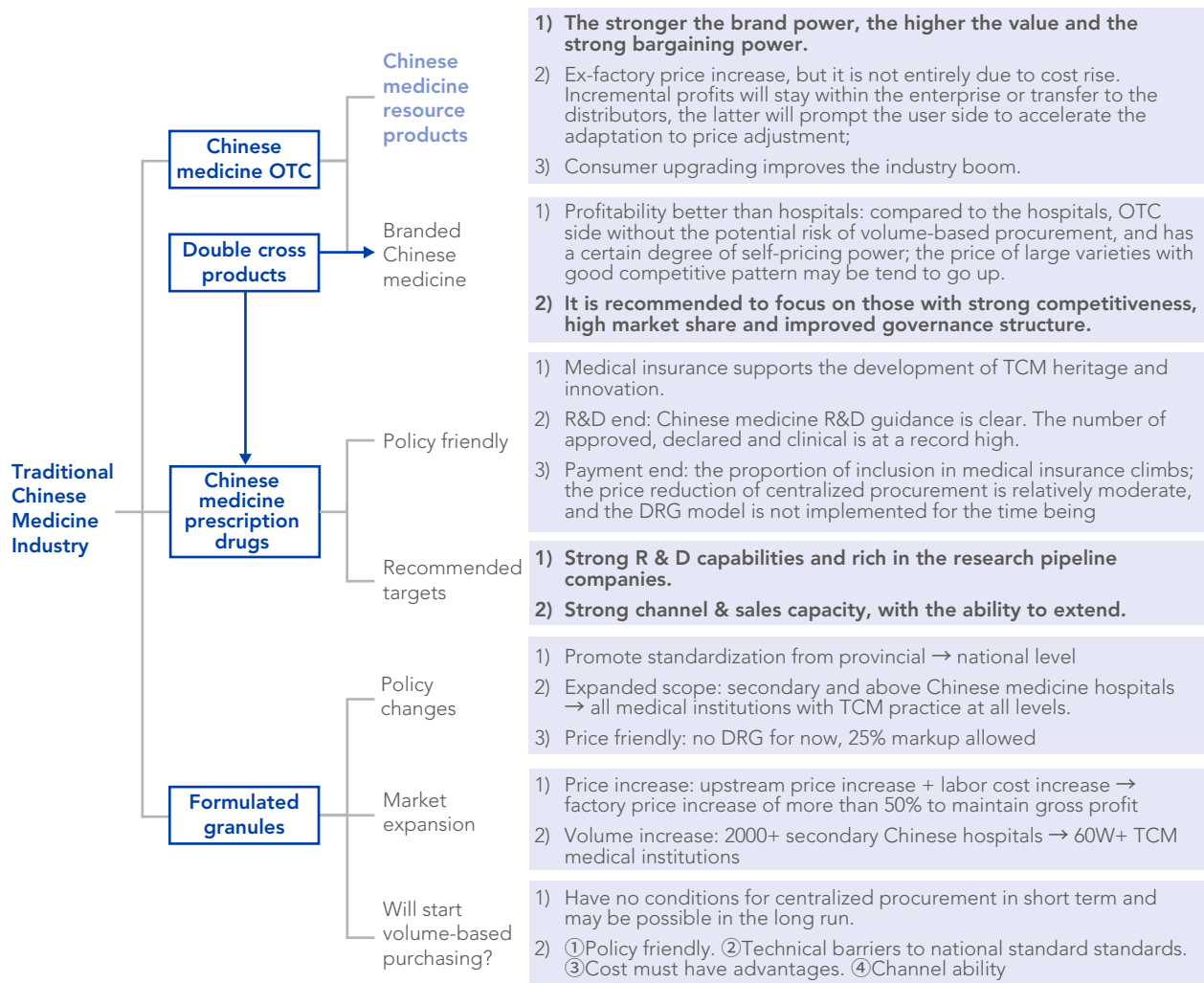
December 2020	Circular on Releasing the Implementation Plan for the Project Improving the Capacity of Chinese Medicine Rehabilitation Services (2021-2025)	Favorable
December 2020	Implementing Opinions on Promoting the Development of Traditional Chinese Medicine Inheritance and Innovation	Favorable
January 2021	Several Policy Measures on Accelerating the Development of Chinese Medicine Features	Favorable
February 2021	Announcement on Ending the Pilot Work of Chinese Medicine Formula Granules	Favorable
April 2021	The National Medical Products Administration approved the promulgation of the first batch of national drug standards for Chinese medicine formula granules	Favorable
June 2021	The Fourteenth Five Year Plan for the Development of Traditional Chinese Medicine	Favorable
June 2021	Opinions on Further Strengthening the Work of Chinese Medicine in General Hospitals and Promoting the Development of Chinese and Western Medicine Together	Favorable
October 2021	The National Medical Products Administration Approved and Enacted the Second Batch of TCM Formula Granule National drug standards	Favorable
October 2021	Implementation Program of the Chinese Medicine Innovation Team and Talent Support Plan	Favorable
November 2021	Circular on Regulating the Clinical Use of Traditional Chinese Medicine Formulas in Medical Institutions	Favorable
December 2021	Guiding Opinions on Medical Insurance Support for the Inheritance and Innovative Development of Chinese Medicine	Favorable

Source: National Health Commission, National Medical Products Administration, National Healthcare Security Administration, etc., National Administration of Traditional Chinese Medicine, etc., HTI

- ✓ **TCM resources:** 1) Enterprises with stronger brand power have higher value (TCM companies with “**Chinese time-honored brands**”, listed as intangible cultural heritage, and exclusive varieties have stronger brand power) and thus have greater bargaining power for both upstream and downstream; 2) ex-factory price increases not entirely driven by cost, the incremental profit will be retained by the enterprises or shared by the dealers, which will accelerate the user’s adaptation to the price adjustment; 3) consumption upgrade improves industry development.
- ✓ **Brand TCM drugs, new channels bring new growth:** 1) Profitability is higher than the hospital channel: Compared with the hospital channel, OTC has no potential volume-based procurement risk, and has certain pricing power, which is conducive to the development of highly competitive enterprises with a high market share, strong channel distribution capability and sound governance structure.
- ✓ **Big changes in the innovative of TCM drug industry:** With the TCM theory, patients’ experiences and clinical trials combined in reviewing TCM products, the number of approvals reached a record high in 2021. It is beneficial to the development of enterprises with strong R&D capabilities and high channel distribution capabilities.
- ✓ **The market expansion of TCM formula granules and the stable competition will promote the long-term development of brand enterprises.**

II. Opportunities in the next decade

Figure 26 Analysis of development trends of the TCM market by segment



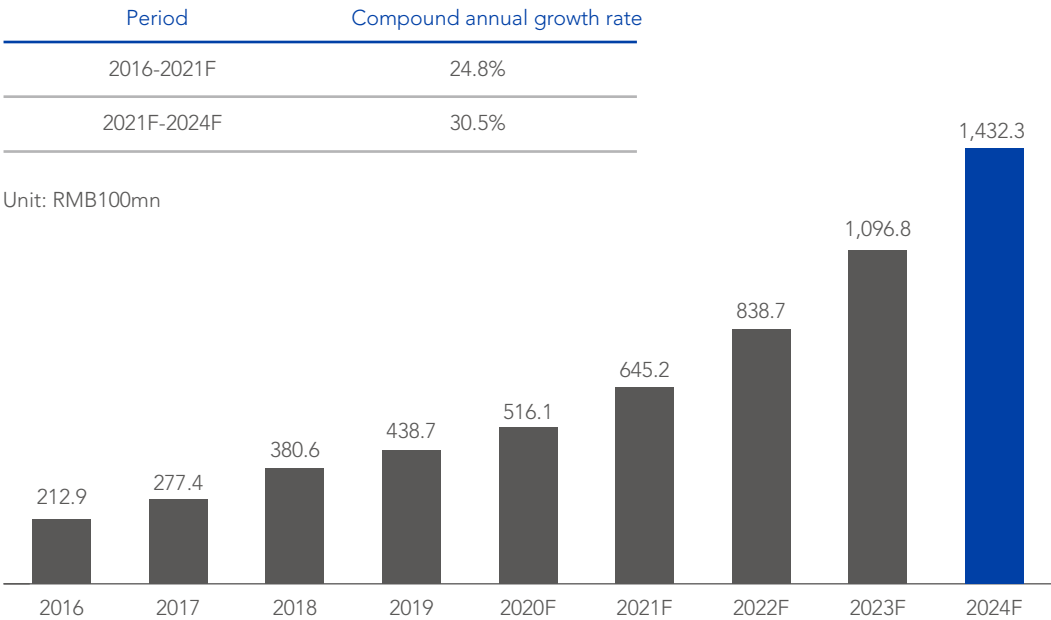
Source: publicly available data, HTI

2.3 Benefiting from the development of the pharmaceutical sector: CXO

2.3.1.1 Market overview: in 2021, the market size of CRO was estimated to be RMB65bn, with an expected compound annual growth rate of about 31% in the next 3 years; the market size of CDMO was estimated to be RMB43bn, with an expected compound annual growth rate of about 31% in the next 3 years. The CXO sector benefits from human resource advantage and the rapid expansion of the pharmaceutical sector

CXO industry is a talent-intensive industry, which needs a large number of medical R&D professionals. In recent years, a large number of graduates with bachelor’s and master’s degrees entered into the human resource market, and a group of overseas returnees mastering advanced technologies have brought abundant engineer dividend to the CXO industry. This has driven the shift of the global pharmaceutical outsourcing industry chain to China, and stimulated the high growth of China’s CXO industry and the rise of local innovative CXO businesses. In 2021, China’s CRO market size was estimated to be RMB64.5bn, up 25%. Compound annual growth rate is expected to be about 31% in the next 3 years.

Figure 27 China’s CRO market size, 2016–2024F

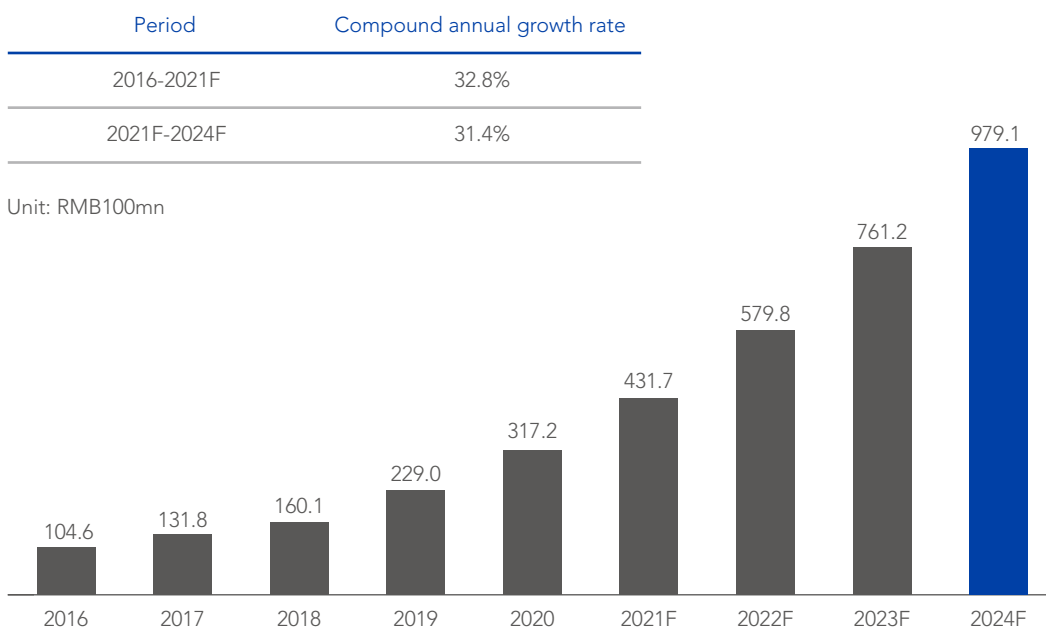


Source: Tigermed Prospectus, HTI

Pharmaceutical R&D and production are characterized by high cost, long cycle and high risk. Driven by active R&D activities of innovative drugs, stricter regulation of clinical trials and launch of drugs, pharmaceutical companies’ demand for dosage form improvement and optimization and capacity expansion at low cost, China’s CDMO market is growing at an accelerated pace. China’s CDMO market was valued at RMB43.17bn in 2021, and it is expected to maintain a growth rate of 31% in the future, and reach RMB97.91bn by 2024.

II. Opportunities in the next decade

Figure 28 China's CDMO market size, 2016–2024F

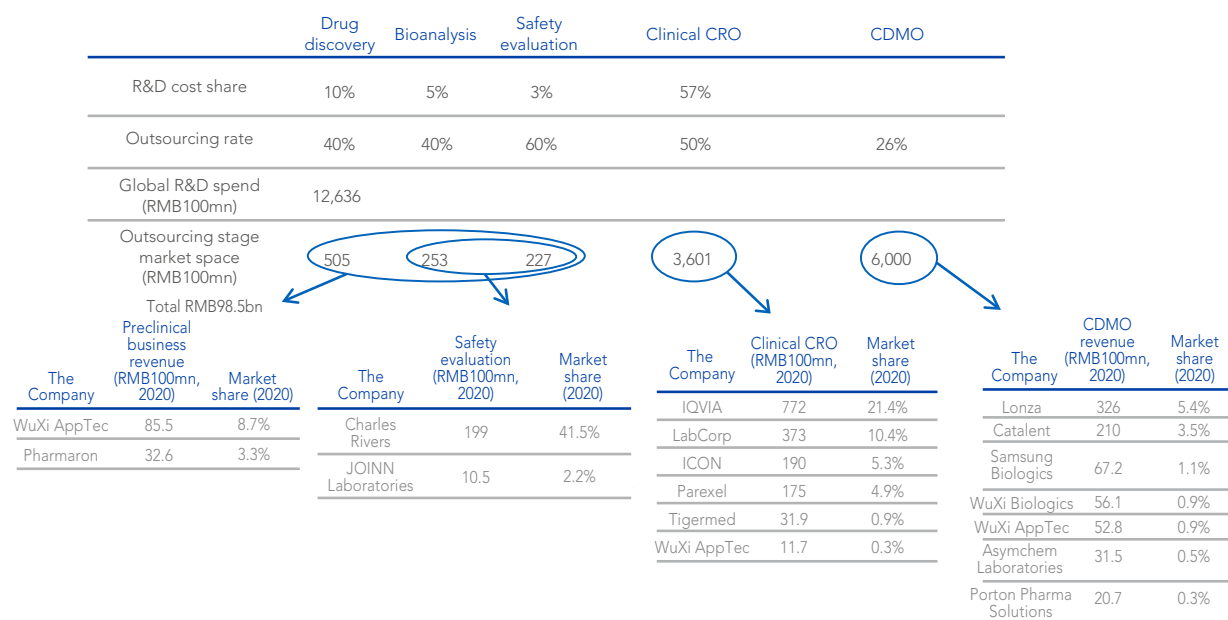


Source: OPM Prospectus, HTI

2.3.1.2 Business model: order-driven industry, manufacturing cost advantage, focusing on the matching of order volume with production capacity

Pharmaceutical outsourcing market space is still large; it is crucial that companies match their ability to secure orders with their production capacity. Compared with the global CRO&CDMO market size, which is above one trillion, the market share of Chinese enterprises is still modest. The future growth of the domestic CXO industry will mainly come from the increase in the market share of domestic enterprises and the increase in the percentage of services outsourced and production capacity at all stages of pharmaceutical R&D.

Figure 29 Global CRO & CDMO by outsourcing service stage, and analysis of market share of international and domestic manufacturers



Source: EvaluatePharma, OECD data, 2020 annual reports of companies, ResultsHealthCare, HTI

2.3.1.3 Development trends: the rise of local innovation, focusing on companies with strong international presence and stable dominant positions in subdivisions

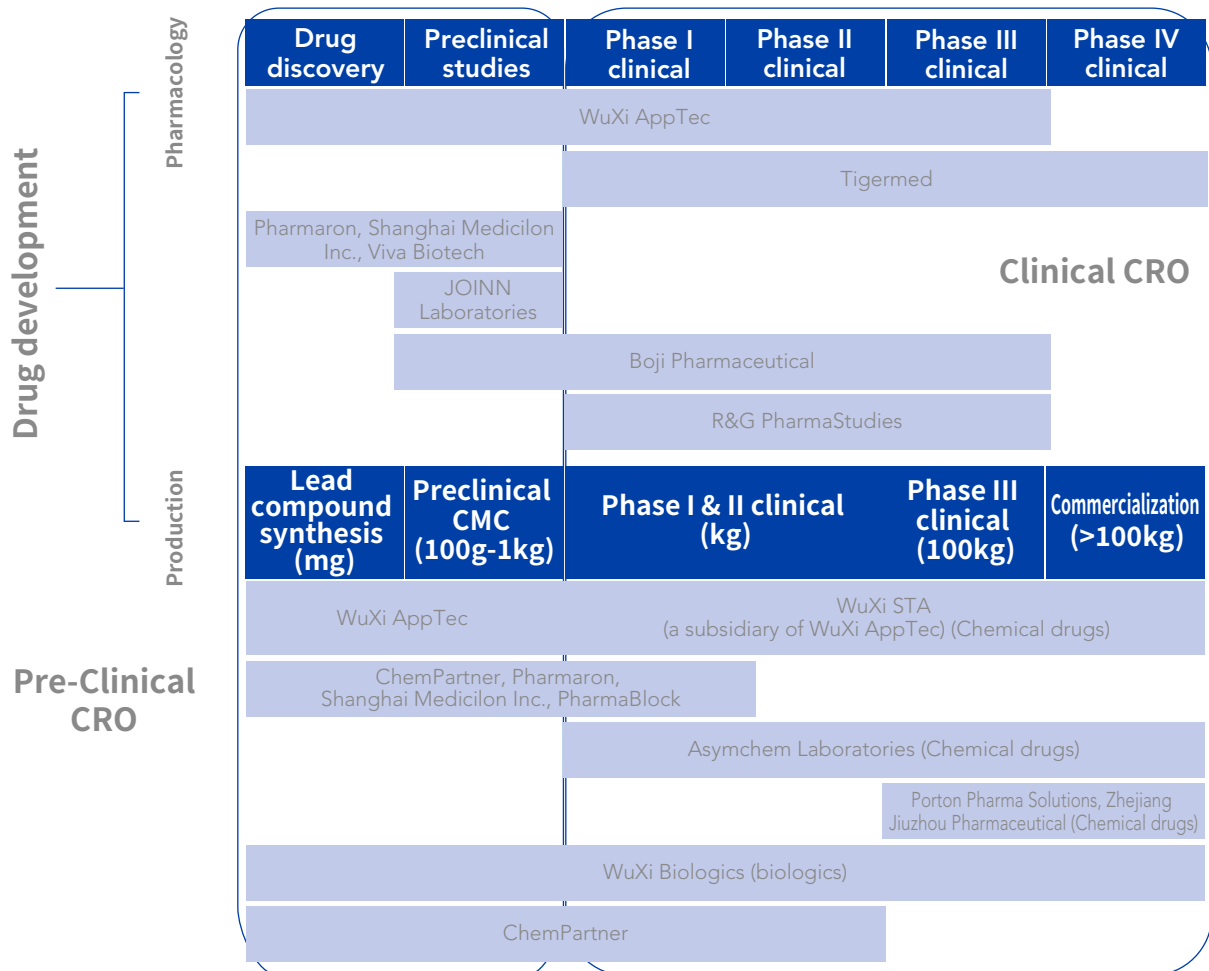
The offshore outsourcing trend of overseas pharmaceutical companies remains unabated. A review of the performance since 2020 showed that overseas clinical CRO has been greatly affected by the COVID-19 pandemic, and clinical CRO business generally declined. The offshore outsourcing of overseas pharmaceutical companies is still the main driving force for the revenue growth of domestic CXO companies, which is not due to the shift caused by the COVID-19, but due to global comparative advantages of domestic CDMO companies over Indian and European peers as verified by COVID-19 related orders.

Pharmaceutical companies' pharmaceutical R&D production outsourcing demands is growing. Domestic pharmaceutical companies need to reduce costs and increase efficiency with the support of CXO to conduct R&D and production in the shift from a combination of imitation and innovation to real innovation. The introduction of the guiding principles of CDE (Center for Drug Evaluation of National Medical Products Administration) has promoted the quality of domestic pharmaceutical R&D and CXO companies was benefited.

The above factors are beneficial to the development of related enterprises. 1 Global CXO leaders that have built an end-to-end business platform; 2 players with advantages in subdivisions, such as CGT CDMO, molecular blocks, model animals, cell culture, including cell gene therapy CDMO in the next-generation R&D wave; 3 companies whose regular business returns to normal development and whose customer business structure continues to improve with the COVID-19 improvement.

II. Opportunities in the next decade

Figure 30 Analysis of major companies in the CRO field and their business distribution



Source: HTI

Section III.

Complementary Advantages of the Mainland and Hong Kong in the Development of the Pharmaceutical Sector



III. Complementary advantages of the mainland and Hong Kong in the development of the pharmaceutical sector

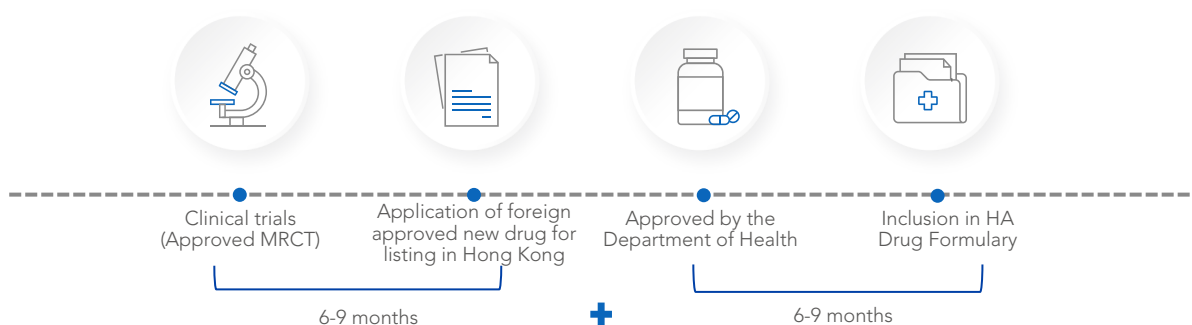
In March 2021, the State Council issued the *Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China*, clearly stating that **it is necessary to build a new pattern with the domestic cycle as the mainstay and the domestic and international cycles reinforcing each other**. China's pharmaceutical sector is in a stage of growth where technological innovation is accelerating and the export of domestic pharmaceutical products is encouraged. The advantages and role of Hong Kong are mainly reflected in the following aspects: **1) Hong Kong introduces overseas advanced technology and pharmaceutical products faster**; 2) it gathers international capital, thus making it **easier for mainland pharmaceutical companies to secure financing**; 3) **clinical trials in Hong Kong are internationally recognized**, helping accelerate the export of domestic products. **Therefore, considering its role in linking the domestic and overseas markets, Hong Kong is expected to become a trade platform for the pharmaceutical sector in Asia.**

3.1 Launch of new drugs: Due to its fast speed in introducing overseas pharmaceutical products, Hong Kong can serve as a bridge between domestic and overseas markets in the flow of technology and products

3.1.1 Most international new drugs can be directly approved and launched in Hong Kong, at least 2–4 years faster than the mainland

The introduction of imported new drugs into the mainland requires clinical trials in the mainland, and it takes about 4–8 years for the new drugs to be approved and launched, and included in the NRDL (China's National Reimbursement Drug List). In Hong Kong, new drugs that have undergone international multi-center clinical trials (MRCTs) are generally exempt from clinical trials, and it takes only 1–2 years for them to be approved by the Department of Health and included in the Hospital Authority's list of drugs, at least 2–4 years faster than the mainland. **Therefore, the introduction of new drugs in Hong Kong is less cumbersome, more efficient and time-saving.** For example, MSD's nine-valent HPV vaccine (Gardasil 9) was approved by FDA in December 2014, and launched in Hong Kong in March 2016. And it was launched in the mainland until 2018, two years later than Hongkong.

Figure 31 New drug launch process in Hong Kong



Source: Hong Kong Department of Health, HTI

3.1.2 The Measure of using HK registered drugs and medical devices used in HK public hospitals in Guangdong-Hong Kong-Macao Greater Bay Area is designed to break down the barrier of the use of medicines and medical devices not yet approved in the mainland through Hong Kong

Under the Measure of using HK registered drugs and medical devices used in HK public hospitals in Guangdong-Hong Kong-Macao Greater Bay Area, the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) has access to the clinically urgent drugs already launched in Hong Kong. The policy not only benefit patients in the mainland, but amass real-world data and accelerate the launch of drugs not yet approved in the mainland. As one of the five major national strategies, the Greater Bay Area development strategy aims to build the GBA into an international science and technology innovation center. According to the plan issued, clinically urgent drugs already launched in Hong Kong and clinically urgent medical devices already purchased by public hospitals in Hong Kong are permitted to be used in designated medical institutions in the Greater Bay Area, namely, In addition, traditional Chinese patent medicines for topical use registered in Hong Kong can also be registered and sold in the Greater Bay Area.

Figure 32 The series of policies of the State Council and the National Medical Products Administration concerning the “Hong Kong-Macao Medicines and Medical Devices Connect” for the Guangdong-Hong Kong-Macao Greater Bay Area



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The Central Committee of the Communist Party of China and the State Council issued the Outline of the Development Plan of Guangdong, Hong Kong and Macao Greater Bay Area



National Medical Products Administration

National Medical Products Administration

Index No.	FGWJ-2022-174	Subject classification	Regulatory / normative documents
Title	Circular of the General Affairs Department of the National Medical Products Administration on Issuing the Implementation Plan for Supporting Drug Marketing Authorization Holders of Hong Kong and Macao in the Manufacturing of Drugs in Nine Mainland Cities in the Greater Bay Area and the Implementation Plan for Supporting Medical Device Registrants of Hong Kong and Macao in the Manufacturing of Medical Devices in Nine Mainland Cities in the Greater Bay Area		
Release date	2022-06-29		

Circular of the General Affairs Department of the National Medical Products Administration on Issuing the Implementation Plan for Supporting Drug Marketing Authorization Holders of Hong Kong and Macao in the Manufacturing of Drugs in Nine Mainland Cities in the Greater Bay Area and the Implementation Plan for Supporting Medical Device Registrants of Hong Kong and Macao in the Manufacturing of Medical Devices in Nine Mainland Cities in the Greater Bay Area



National Medical Products Administration

National Medical Products Administration

Circular of the State Administration for Market Regulation and Other Authorities on Issuing the Work Plan for the Innovative Development of the Regulation of Drugs and Medical Devices in the Guangdong-Hong Kong-Macao Greater Bay Area

Source: CPC Central Committee and the State Council, National Medical Products Administration, HTI

III. Complementary advantages of the mainland and Hong Kong in the development of the pharmaceutical sector

As of August 2022, 28 types of medicines and medical devices in three batches have been approved for use, greatly benefiting patients. The first batch of designated medical institutions include 5 hospitals, namely the University of Hong Kong Shenzhen Hospital, C-MER(Zhuhai)Dennis Lam Eye Hospital, Modern Hospital Guangzhou, Guangzhou United Family Hospital and Zhongshan Chenxinghai Hospital. As of August 2022, 17 types of imported drugs and 11 types of medical devices had been approved for urgent clinical use (multiple specifications or models are counted as one type).

Figure 33 List of imported drugs and medical devices that are urgently needed for clinical use in the Guangdong-Hong Kong-Macao Greater Bay Area

No.	Drug name	Therapeutic area	Designated medical institution	Batch/time
1	Ipilimumab injection	Tumor	The University of Hong Kong — Shenzhen Institute	
2	Baclofen injection	Musculoskeletal	Guangzhou United Family Hospital, Zhongshan Chenxinghai Hospital, The University of Hong Kong — Shenzhen Institute	Third batch August 2022
3	Inoxicillin	Cardiovascular		
4	Erenalizumab	Cerebrovascular		
5	Apelisis film coated tablets	Tumor	The University of Hong Kong — Shenzhen Hospital	Second batch February 2022
6	Eldatinib Tablets	Tumor		
7	Budesonide extended-release capsules	Urogenital		
8	Hydroxocobalamin for injection	Multiple		
9	Busilizumab	Metabolism	C-MER (Zhuhai) Dennis Lam Eye Hospital	
10	Carmatinib	Tumor	Modern Hospital Guangzhou	
11	Roflumilast tablets	Respiratory system		
12	Entratinib capsules	Tumor		
13	Lolatinib tablets	Tumor		
14	Vipolatumomab injection	Tumor	The University of Hong Kong — Shenzhen Hospital	First batch August 2021
15	Aminohexenylic acid film-coated tablets	Neurology		
16	Benalizumab pre-filled syringe injection	Respiratory system		
17	Cabozantinib film-coated tablets	Tumor		

Note: Luratinib tablets were introduced in August 2021 (U.S. marketed in November 2018, Pfizer) and moved out of the catalog after approval for domestic marketing in April 2022.

Note: Ipilimumab injection is approved for “unresectable or metastatic malignant melanoma, intermediate/high-risk advanced renal cell carcinoma, and metastatic non-small cell lung cancer with negative epidermal growth factor receptor (EGFR) gene mutation or negative mesenchymal lymphoma kinase (ALK).

No.	Device name	Designated medical institution	Batch/time
1	Bright blue g blue domain stain for ophthalmic surgery	C-MER (Zhuhai) Dennis Lam Eye Hospital	
2	Taipan blue lens anterior capsule membrane stain		
3	TYRXTM absorbable antibacterial envelope		
4	Multiple pathogens nucleic acid combination detection system		
5	Bloodstream infection multiple pathogen nucleic acid assay kit (Closed nested multiplex PCR melting curve method)	The University of Hong Kong — Shenzhen Institute	Third batch August 2022
6	Upper respiratory tract infectious agent nucleic acid test kit (Closed nested multiplex PCR melting curve method)		
7	Pulmonary infection pathogen nucleic acid test kit (Closed nested multiplex PCR melting curve method)		
8	Four-branch artificial vessel with stent	The University of Hong Kong — Shenzhen Hospital	Second batch February 2022
9	Cell sorting/processing system		
10	Magnetic controlled extension titanium rod/manual extender/traction rod electromagnetic retractor	The University of Hong Kong — Shenzhen Hospital	First batch August 2021
11	Marking point — endoscopic staining and marking ink		

Source: National Health Commission, National Medical Products Administration, National Healthcare Security Administration, HTI

3.2 Financing convenience: Hong Kong gathers international capital and facilitates financing, benefiting biotech companies

3.2.1 Hong Kong's free market economy and outstanding capital advantages make it easier for mainland pharmaceutical companies to secure financing

Hong Kong has advanced scientific research conditions, is highly market-oriented, and gathers international capital. In contrast, the mainland boasts obvious policy advantages, strong scientific research capability, and a solid industrial foundation. Hong Kong and the mainland are highly complementary in the development of the pharmaceutical sector.

III. Complementary advantages of the mainland and Hong Kong in the development of the pharmaceutical sector

Figure 34 Analysis of the development endowments of the biopharmaceutical sector between the mainland and Hong Kong

Industry endowment	Mainland China	Hong Kong
Capital	Increasing investment year by year	International financial center and capital pooling
Scientific research facilities	Generally old and outdated	Advanced research facilities
Market mechanism	Gradually increasing marketization	Free market economy mechanism is mature
Talent	Lack of experience in multinational business and international management	Many talents and experienced in multinational business management
Policy	High government attention, unified planning and coordinated development	Government encourage the development
Industrial base	Equipped with complete supporting facilities and boast of solid foundation	A certain industrial foundation
Research and development	Strong foundation and boast of a great number of scientific and technical personnel	Certain research and development base

Source: National Health Commission, National Medical Products Administration, National Healthcare Security Administration, HTI

3.2.2 Hong Kong has become a financing hub for biotech companies after the introduction of Chapter 18A

Chapter 18A allows biotech companies without revenue to go public conditionally, facilitating financing for innovative biotech companies in the R&D stage that have not yet been commercialized. As of October 2022, 52 biotech companies had gone public under such rule, raising more than HKD110bn. In April 2018, the Hong Kong Stock Exchange amended the Rules for the Listing of Securities on The Stock Exchange of Hong Kong Limited by adding Chapter 18A “Biotech Companies”, which allows biotech companies without revenue to apply for listing in Hong Kong provided that their core products have passed Phase I clinical trials and the competent authorities do not reject the company to conduct Phase I clinical trials. As of October 2022, nearly 90 pharmaceutical R&D and production companies had been listed on the main board of Hong Kong, including 52 biotech companies without revenue, raising more than HKD115.2bn in total. According to the sixth edition of the HKEx and Biotechnology report released by HKEx in 2021, HKEx has become the largest biotech financing center in Asia and the second largest in the world.

Five of the 52 biotech companies listed have been successfully remove “B” mark, including BeiGene, Innovent Biologics, Shanghai Junshi Biosciences, Shanghai Henlius Biotech and CanSino Biologics. As the products in the pipeline of unprofitable biotech companies are gradually delivered, it is expected that in the next 3–4 years, a number of listed companies will remove “B” mark, which will further promote the development of Hong Kong’s biotech capital market.

Table Statistics of biotech and medical device companies under Chapter 18A listed on the Hong Kong Stock Exchange, as of October 7, 2022

No.	Ticker	Stock name	Type	HKD100mn			Listing date
				Market value on the first day of listing	Market value as of October 7, 2022	Amount of raised fund	
1	2315.HK	Biocytogen	Biological technology	103.1	104.8	6.2	9/1/2022
2	2297.HK	Rainmed	Medical devices	61.6	34.3	1.5	7/8/2022
3	2179.HK	Recbio	Biological technology	121.0	107.7	8.6	3/31/2022
4	2157.HK	Lepu Medical	Biological technology	118.4	154.3	9.1	2/23/2022
5	2257.HK	Sirnaomics	Biological technology	68.6	57.3	5.6	12/30/2021
6	2185.HK	Bioheart	Medical devices	49.0	144.7	5.1	12/23/2021
7	1228.HK	Canbridge	Biological technology	37.8	12.3	6.9	12/10/2021
8	2197.HK	Clover Biopharmaceuticals	Biological technology	150.3	21.4	20.1	11/5/2021
9	2251.HK	Airdoc Technology	Medical devices	70.4	11.1	16.7	11/5/2021
10	2252.HK	MedBot	Medical devices	436.5	188.8	18.0	11/2/2021
11	2235.HK	Mictotech Medical	Medical devices	129.2	31.5	20.1	10/19/2021
12	2256.HK	Abbisko	Biological technology	87.1	21.8	17.5	10/13/2021
13	6628.HK	Transcenta	Biological technology	59.0	16.6	6.5	9/29/2021
14	2216.HK	Broncus Medical	Medical devices	78.8	8.9	16.7	9/24/2021
15	6669.HK	Acotec Medical	Medical devices	55.2	27.2	16.3	8/24/2021
16	6609.HK	Heartcare	Medical devices	50.1	11.4	11.3	8/20/2021
17	2137.HK	BriiBiosciences	Biological technology	162.1	37.2	27.9	7/13/2021
18	2162.HK	Keymed Biosciences	Biological technology	184.3	102.5	35.7	7/8/2021
19	2190.HK	ZYLOK-TONBRIDGE	Medical devices	194.0	35.5	29.5	7/5/2021
20	2171.HK	CARSGEN THERAPEUTICS	Biological technology	170.2	64.3	31.1	6/18/2021
21	6622.HK	Zhaoke Ophthalmology	Innovative drugs	76.6	14.1	20.8	4/29/2021
22	6606.HK	New Horizon Health	Medical devices	351.1	62.5	23.5	2/18/2021
23	2170.HK	Basecare	Medical devices	73.9	8.5	20.1	2/8/2021
24	2160.HK	MicroPort CardioFlow Medtech	Medical devices	445.3	53.7	28.8	2/4/2021
25	1167.HK	Jacobio	Innovative drugs	109.5	36.6	15.2	12/21/2020
26	2142.HK	HBM	Biological technology	84.6	14.6	17.1	12/10/2020
27	6996.HK	Antengene	Biological technology	122.1	22.4	28.4	11/20/2020
28	9995.HK	RemeGen	Biological technology	333.9	279.4	45.9	11/9/2020
29	2126.HK	JW Therapeutics	Biological technology	82.8	13.3	26.0	11/3/2020

III. Complementary advantages of the mainland and Hong Kong in the development of the pharmaceutical sector

No.	Ticker	Stock name	Type	HKD100mn			Listing date
				Market value on the first day of listing	Market value as of October 7, 2022	Amount of raised fund	
30	1952.HK	Everest Medicines	Biological technology	206.4	22.1	40.2	10/9/2020
31	6998.HK	Genor Biopharma	Biological technology	134.5	9.6	31.1	10/7/2020
32	9688.HK	Zai Lab	Biological technology	524.2	261.7	68.3	9/28/2020
33	1477.HK	Ocumension	Innovative drugs	212.8	75.9	17.9	7/10/2020
34	6978.HK	IMMUNOTECH	Biological technology	77.4	22.1	12.6	7/10/2020
35	9939.HK	Kintor Pharmaceutical	Innovative drugs	79.4	45.8	18.6	5/22/2020
36	9996.HK	Peijia Medical	Medical devices	157.4	42.2	26.9	5/15/2020
37	9926.HK	Akeso	Biological technology	185.4	230.0	29.7	4/24/2020
38	9969.HK	InnoCare Pharma	Biological technology	122.8	147.2	25.8	3/23/2020
39	9966.HK	Alphamab Oncology	Biological technology	121.1	56.6	21.0	12/12/2019
40	2500.HK	Venus Medtech	Medical devices	169.1	40.3	29.8	12/10/2019
41	3681.HK	Sinomab Bioscience	Biological technology	60.4	18.3	13.8	11/12/2019
42	1875.HK	TOT BIOPHARM International	Biological technology	35.7	22.2	5.9	11/8/2019
43	6855.HK	Ascentage Pharma Group International	Biological technology	77.9	30.2	4.8	10/28/2019
44	2696.HK	Shanghai Henlius Biotech	Biological technology	266.6	62.3	34.3	9/25/2019
45	2181.HK	Mabpharm	Biological technology	49.9	14.4	11.8	5/31/2019
46	6185.HK	CanSino Biologics	Biological technology	75.7	208.0	13.6	3/28/2019
47	2616.HK	CStone Pharmaceuticals	Biological technology	126.5	40.7	25.7	2/26/2019
48	1877.HK	Junshi Biosciences	Biological technology	171.3	442.1	35.4	12/24/2018
49	1801.HK	Innovent	Biological technology	185.4	372.8	38.0	10/31/2018
50	2552.HK	Hua Medicine	Innovative drugs	87.1	41.6	8.9	9/14/2018
51	6160.HK	BeiGene	Biological technology	796.9	1,112.4	70.8	8/8/2018
52	1672.HK	Asclepis Pharma Inc.	Innovative drugs	156.9	28.8	31.4	8/1/2018

Source: Wind, HTI

3.3. Industrial policy: clinical trials in Hong Kong are internationally recognized, accelerating the export of mainland products

3.3.1 Clinical trials conducted in Hong Kong are recognized by the competent authorities of the United States, Europe, China and other countries simultaneously

Clinical trials in Hong Kong are internationally recognized, and clinical trials of mainland products in Hong Kong are more cost-effective. Nowadays, while improving technological innovation capacity, pharmaceutical enterprises in the mainland are also seeking to go overseas. However, to build overseas research and commercial teams is costly and risky. Hence, in the early stage, most pharmaceutical companies in the mainland seeking overseas expansion would adopt the License-out model, that is, authorizing the rights and interests of clinical development and commercialization of new drugs to multinational pharmaceutical companies. Now an increasing number of domestic companies opt to conduct international multi-center clinical trials. Clinical test data in Hong Kong can be recognized by regulatory agencies such as FDA, EMA and NMPA for drug registration. Currently, a total of 32 specialties of Queen Mary Hospital, Prince of Wales Hospital, Hong Kong Eye Hospital and Hong Kong Sanatorium & Hospital have been accredited by NMPA as clinical trial institutions, and their clinical trial data can be used for drug registration applications in the mainland.

3.3.2 Hong Kong focuses on building an international center for innovative medical technology, and has already cooperated with 28 internationally renowned universities

It has established 14 major medical technology R&D centers in cooperation with 28 internationally renowned universities. The flagship project "InnoHK R&D Platform" launched by Hong Kong SAR government has successfully attracted 28 R&D laboratories jointly sponsored by world-class universities and research institutions and local universities, including Oxford University, Cambridge University, Harvard University, University of Waterloo, Melbourne University, Peking University, University of Hong Kong, Institute Pasteur, etc. The Health@InnoHK medical technology innovation platform focuses on cutting-edge technology projects, and has established 14 major R&D centers.

III. Complementary advantages of the mainland and Hong Kong in the development of the pharmaceutical sector

Figure 35 Hong Kong industry policy for the development of an international center for innovative medical technology





Source: HKSAR Government, Hong Kong Science and Technology Parks, innohk.gov.hk, HTI

In the biotechnology industry, the Hong Kong SAR government has launched the **Biomedical Technology Incubation Programme (INCUBIO)**. Based in the Hong Kong Science Park, the program provides business assistance, investment matching, grants and other benefits and support for biotech start-ups in Hong Kong, including financial aid of up to HKD6mn. It gives biomedical technology start-ups affiliated with the Hong Kong Science Park access to professional laboratory facilities.

In the TCM sector, the Hong Kong SAR government invested HKD500mn to establish the TCM Development Fund in 2018, which was put into operation in June 2019. The goal is to promote the development of the major players in the TCM industry such as clinics, patented TCM and herbal medicine manufacturers and distributors.

Figure 36 Hong Kong industry policies for biotechnology and TCM sectors

	<div style="border: 1px solid blue; padding: 5px; width: fit-content; margin: 0 auto;">Biotechnology industry</div>  Hong Kong Science and Technology Parks Incubation Programme for Biomedical Technologies	<div style="border: 1px solid blue; padding: 5px; width: fit-content; margin: 0 auto;">Traditional Chinese Medicine Industry</div>  中醫藥發展基金 Chinese Medicine Development Fund
Launch program	Hong Kong SAR Government	Hong Kong SAR Government
Integrated executor	Hong Kong Science Park	Chinese Medicine Division, Medical and Health Bureau, Hong Kong Productivity Council
Supporting subjects	Biotechnology start-ups	Clinics, proprietary Chinese medicine and herbal medicine manufacturers and distributors, etc.
Support	Various benefits and support such as business support, investment matching and grant funding, including up to HKD6mn in financial assistance	A total investment of HKD500mn in the Enterprise Support Programme and the Industry Support Programme to provide comprehensive support

Source: InvestHK, Hong Kong Science Park, TCM Development Fund, HTI

3.3.3 Hong Kong and the mainland work together to speed up drug registration in Hong Kong, and facilitate the “transfer” of drugs and medical devices

Hong Kong’s policy continues to support the registration of mainland drugs in Hong Kong and expands the availability of imported drugs from Hong Kong to the Greater Bay Area. On October 19, 2022, the Hong Kong SAR Government released *the Chief Executive’s 2022 Policy Address*. The Policy Address further clarifies the cooperation between Hong Kong and the mainland. By referring to the registration certificates issued by the National Medical Products Administration and other regulatory agencies, Hong Kong will approve the drugs already registered in the mainland and related regions for registration and sale in Hong Kong provided they meet the requirements in terms of safety, efficacy and quality standards, thereby diversify medicine supply. Meanwhile, Hong Kong will work closely with the mainland on the “Hong Kong-Macao Medicines and Medical Devices Connect” policy, to make more Hong Kong-registered medicines and medical devices available in the Greater Bay Area. In addition, Hong Kong will also look at ways to promote the use of elderly medical vouchers to pay for mainland medical insurance for Hong Kong residents living in the Greater Bay Area.

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2. restrict or inhibit any other user from using and enjoying the Website;
3. post or transmit any unlawful, fraudulent, libellous, defamatory, obscene, pornographic, profane, threatening, abusive, hateful, offensive, or otherwise objectionable or unreasonable Information of any kind, including without limitation any transmissions constituting or encouraging conduct that may constitute a criminal offence, give rise to civil liability, or otherwise violate any local, state, national or foreign law;
4. post or transmit any advertisements, solicitations, chain letters, pyramid schemes, investment opportunities or schemes or other unsolicited commercial communication, or engage in spamming or flooding;
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 - ii. advertising and/or promoting any goods and services;
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The links on the Website may take you to other sites and you acknowledge and agree that HKTDC and the HKTDC Affiliates have no responsibility for the accuracy or availability of any Information provided by linked websites.

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7. Indemnity

You agree to on demand defend, indemnify and hold us and the HKTDC Affiliates harmless from and against all liabilities, damages, claims, actions, costs and expenses (including without limitation legal fees), in connection with or arising from your breach of any provision in these Terms of Use and/or your use of the Website and/or the Information available from time to time on the Website for any purpose whatsoever (whether or not constituting a breach of any provision in these Terms of Use). We may, if necessary, participate in the defence of any claim or action and any negotiations for settlement. No settlement which may adversely affect our rights or obligations shall be made without our prior written approval. We reserve the right, at our own expense and on notice to you, to assume exclusive defence and control of any claim or action.

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3. messages sent through the internet including in connection with the Services will be free from interception, corruption, error, delay or loss;
4. access to the Website will be available or be uninterrupted;
5. use of the Website or Services will achieve any particular result; or
6. defects in the Website will be corrected.

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Without prejudice to the foregoing, if your use of the Services does not proceed satisfactorily and/or where applicable you do not receive appropriate responses to such use from HKTDC as set out in these Terms of Use or the applicable terms according to clause 1.2 above or otherwise, you are advised to contact us via [contact form](#) or by telephone at (852)1830668. No such lack of response shall be deemed to constitute any acquiescence or waiver.

The limitation of liability contained in these Terms of Use will apply to the fullest extent permitted by applicable laws.

10. Privacy Policy

For information about our privacy policies and practices, please refer to our Privacy Policy Statement. You agree to the use and disclosure of your information in the manner set out in our [Privacy Policy Statement](#) (as updated from time to time). Where personal data is collected in connection with the Services, you should also have reference to the relevant user agreements linked to the form through which your personal data is collected.

For information on our use of cookies, please also refer to our [Privacy Policy Statement](#).

11. Partial Invalidity

The illegality, invalidity or unenforceability of any provision of these Terms of Use under the law of any jurisdiction shall not affect its legality, validity or enforceability under the laws of any other jurisdiction nor the legality, validity or enforceability of any other provision.

12. Several Users

If there are two or more persons adhering to these Terms of Use as user, their liability under the Terms of Use is joint and several, and their rights are joint.

13. Miscellaneous

No waiver of any breach under these Terms of Use will amount to a waiver of any other breach. The headings in these Terms of Use are for convenience only and do not affect interpretation.

14. Termination

We may, in our sole discretion and at any time, without prior notice to you and without cause, terminate all or any part of our Services to you and consequentially prohibit your right to access to the Services and/or the Website and remove any information and data linked to your profile or registered account.

15. Governing Law and Jurisdiction

These Terms of Use shall be governed by the law of the Hong Kong Special Administrative Region. You agree to submit to the non-exclusive jurisdiction of the Hong Kong courts.

16. Chinese Version

If there is any conflict or difference between the Chinese version of the Terms of Use and its English version, the English version prevails. If any part of the Chinese version is unclear, reference should be made to the English version. The Chinese version may not be translated into English for the purpose of comparing with or interpreting the English version.



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