CPA-McKinsey China Hospital Pharmaceuticals Report: An In-depth Perspective

August, 2017

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About this report

Context for this report

The CPA-McKinsey report is published by a joint research team established by the Science and Technology Development Center of the Chinese Pharmaceutical Association (DCSTCPA) and McKinsey & Company, to generate insights on China's hospital pharmaceutical market.

The joint effort between DCSTCPA and McKinsey builds on the unique and distinctive strengths of both organizations. DCSTCPA boasts the most thorough and high quality hospital pharmaceutical data available, while McKinsey combines proprietary data with a rigorous analytical approach. Through this collaboration, we aim to create high quality reports focusing on the dynamics of the hospital pharmaceutical market in China.

We released the fourth report under this joint effort in 2015. It contained analyses based on data from 2009 to 2014. This fifth report has been updated to include data through 2016. It contains a detailed section on the rapidly growing and highly dynamic innovative drugs market.

Going forward, we will continue to update the data and analyses. We welcome your feedback and comments.

About the methodology

Our report focuses on the hospital pharmaceutical market, which we define according to statistics from China's National Health and Family Planning Commission. It includes information on all general and specialized hospitals but does not discuss data from various health centers (such as community health centers and village/rural clinics). Although China's pharmaceutical market also includes other important channels, such as retail pharmacies, they are not covered in this report.

We concentrated on hospitals because they account for the largest share of pharmaceutical sales in the country. Developing insight into this channel is thus critical to capturing the opportunity in China, the second largest pharmaceutical market in the world.

Hospitals are categorized as Class I, II, or III according to government definitions, with Class III representing the largest hospitals. Unclassified hospitals are categorized according to available infrastructure information (e.g., bed numbers).

The market value in this report represents Western medicine only and is calculated based on ex-trade price, which is equivalent to the hospital purchase price.

"City tiers" in this report are defined according to the city-tier system developed by the McKinsey Global Institute. This system divides Chinese cites (including 649 official cities and 290 city-equivalent counties) into four broad tiers based on GDP, population, and other characteristics. Beijing, Shanghai, Guangzhou, and Shenzhen are the four Tier 1 cities; Tier 2 includes 46 cities (e.g., Tianjin, Nanjing, Hangzhou, Wuxi, and Wenzhou); Tier 3 covers 193 cities (e.g., Lanzhou, Guiyang, and Shantou); Tier 4 encompasses 696 cities, (e.g., Penglai, Yanji, and Longhai). The rest of China is classified as county/rural (see Appendix 1).

The therapeutic areas in this report are classified according to the World Health Organization's (WHO) Anatomical Therapeutic Chemical (ATC) classification system.

The analyses in Section II are based on data from 1,029 sample hospitals in 31 provinces. This represents an increase from the 917 sample hospitals that were included in the previous report. The analyses in Section III are based on 688 hospitals in 28 provinces that purchase innovative drugs. The majority of the sample hospitals are Class III and Class II hospitals (see Appendix 2). Section III focused on analyzing 24 innovative drugs launched during the period 2010-2012 (to allow for at least 4 full years of available post-launch sales data, see Appendix 3).

中国药学会科技开发中心
Science and Technology Development Center
of Chinese Pharmaceutical Association

麦肯锡公司
Greater China office
McKinsey & Company

Key messages

China's hospital pharmaceutical market

- China's overall hospital pharmaceutical market reached around RMB 734 billion in value in 2016. While year-on-year growth has continued to slow, it still grew at a healthy 11% in 2016.
- Class III hospitals account for 67% of total hospital pharmaceutical market sales, with a CAGR of 17% from 2011 to 2016, compared to 11% for the rest of the market.
- Tier 2 and 3 cities represent 60% of total sales and are growing fastest at 16%. In contrast, Tier 1 cities are growing at a slower rate of 10%.

Innovative drugs market at a glance

- The 24 innovative drugs launched in China between 2010 and 2012 grew at 27% per annum from 2013 to 2016, and reached RMB 4.4 billion annual revenue by 2016. The innovative drug market is heavily concentrated in Class III hospitals and Tier 1 and 2 cities. The top 3 brands, Avastin, Lucentis, and Conmana, account for approximately 70% of total innovative drug sales.
- Hospital listing is critical for successful launch: "Leading launches" have achieved much faster hospital listing penetration as compared to "other launches" across city tiers.
- Clinical trials participation accelerate adoption of new therapies: Significantly better post launch performance of new drugs was observed in hospitals that were clinical trial sites during the registration process, indicating that physician participation in trials boosts their confidence in adopting new therapies post launch.
- National price negotiation leads to significant volume increase yet revenue dropped: After significant price cuts from national negotiations, three pilot products – Viread, Iressa and Conmana – experienced an uptick in volume but a decline in revenue in the first half of 2016 in CPA sample hospitals (Note: potential bias may exist due to sample hospital coverage).

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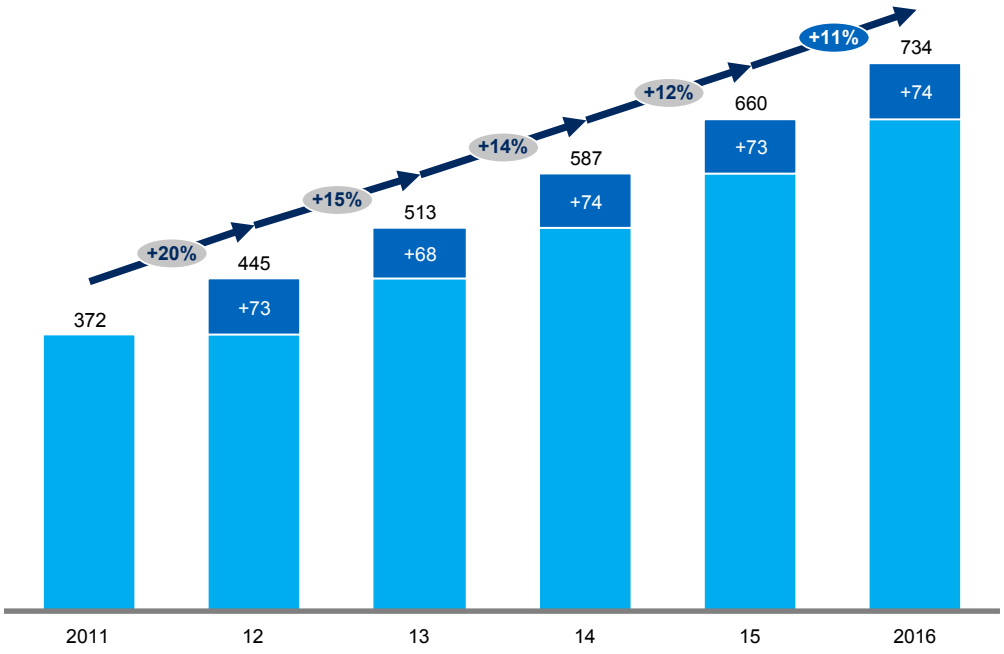
Section I: Overview of China's hospital pharmaceutical market

China's overall hospital pharmaceutical doubled from 2011 to 2016, but has experienced a gradual decline in growth in recent years: *(Exhibit 1.1)*

- China's overall hospital pharmaceutical market reached a value of RMB 734 billion in 2016.
- The market grew at a CAGR of about 15% from 2011 to 2016; however, the annual growth rate dropped to 11% in 2016.
- Incremental value added year-on-year remained steady from 2011 to 2016, with RMB 74 billion added to the value of the market in 2016.

Exhibit 1.1

Size of China western medicine market in hospital channel[1]
RMB billions



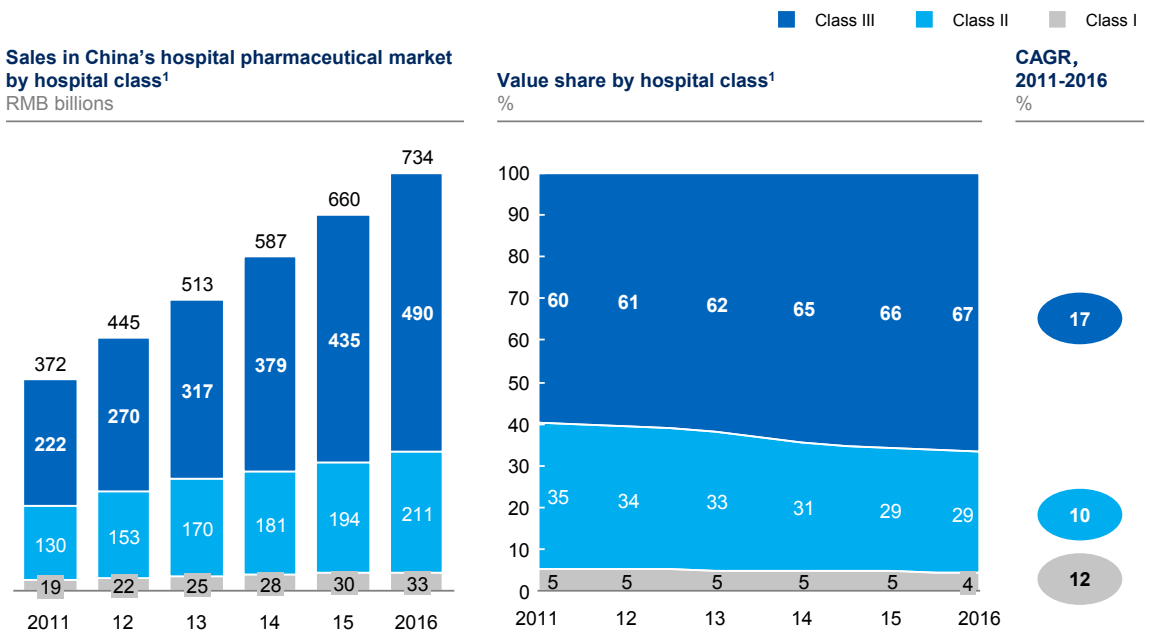
1 Market size extrapolated based on CPA sample hospital pharmaceutical sales, using ex-trade prices

SOURCE: Chinese Pharmaceutical Association; NHFPC statistical yearbook; McKinsey analysis

From a hospital class viewpoint, Class III hospitals still account for the largest share of the pharmaceutical market: *(Exhibit 1.2)*

- Class III hospitals comprise 67% of the market, and growth in this segment outpaces that of other segments.
- Class II hospitals represent 29% of the market, while Class I hospitals represent 4%; both have lower growth rates than Class III hospitals.
- Implementation of tiered treatment system is likely to fuel faster growth in lower class hospitals. However, such a trend has not been observed in this analysis, potentially due to the fact that tiered diagnosis is driven more across city tiers rather than across hospital classes, or is due to a limited sample size in lower class hospitals.

Exhibit 1.2



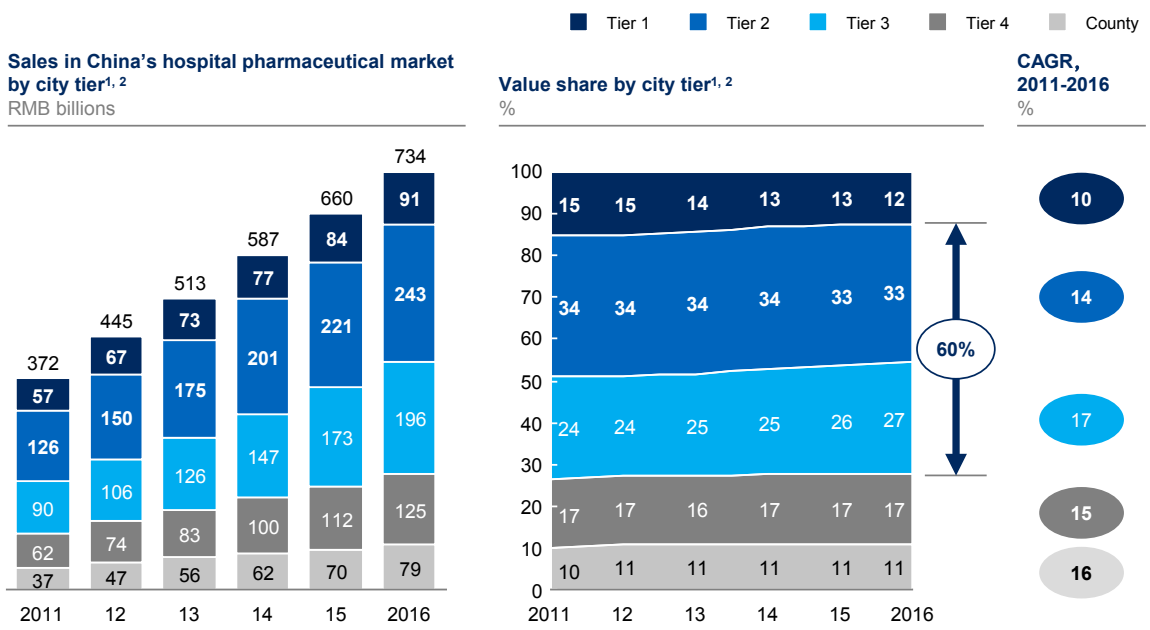
1 Market size extrapolated based on CPA sample hospital pharmaceutical sales, using ex-trade prices; CHC market not included

SOURCE: Chinese Pharmaceutical Association; NHFPC statistical yearbook; McKinsey analysis

Tier 2 and 3 cities account for the largest share of sales in China's hospital pharmaceutical market: *(Exhibit 1.3)*

- In 2016, Tier 2 and 3 cities represented 60% of China's hospital pharmaceutical market (Tier 2 and 3 cities account for only 30% of the national population and 52% of GDP).
- Tier 1 cities grew slowest compared to the rest the market; their value share shrank by 3% between 2011 and 2016, highlighting the need for manufacturers to continue to expand their coverage beyond their traditional core markets.
- Tier 3 cities grew fastest at a CAGR of approximately 17%, with market value more than doubling between 2011 to 2016, potentially driven by the tiered diagnosis and treatment. This also highlights an opportunity for market expansion.

Exhibit 1.3



1 Market size extrapolated based on CPA sample hospital pharmaceutical sales, using ex-trade prices
2 There are 4 cities in Tier 1; 46 cities in Tier 2; 193 cities in Tier 3; and 696 cities in Tier 4. The rest of China is classified as county/rural. (See Appendix 1)

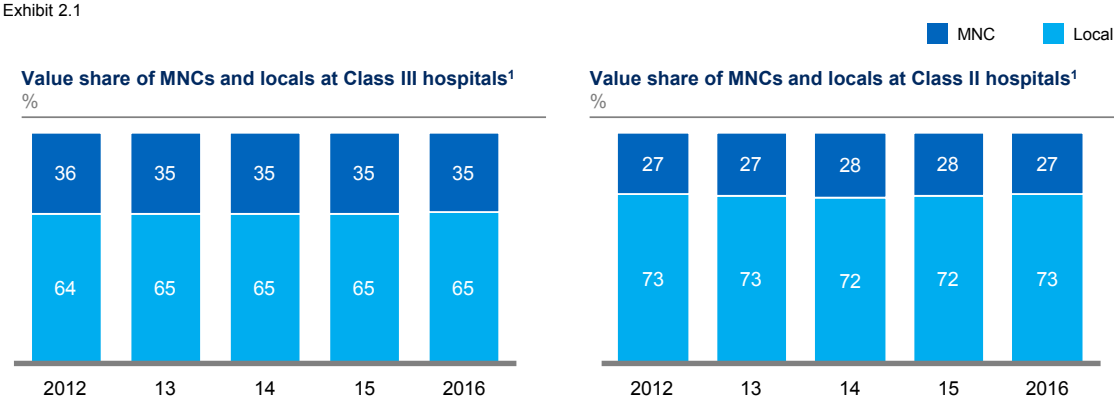
SOURCE: Chinese Pharmaceutical Association; NHFPC statistical yearbook; McKinsey analysis

Section II: Analysis of market leaders and major therapeutic areas

MNCs' value share has been relatively constant within Class III and II hospitals and Tier 1 and Tier 2 cities from 2012 to 2016:

- MNCs have a higher value share in Class III hospitals (35%) than in Class II hospitals (27%) in 2016 *(Exhibit 2.1).*
- MNCs also have a higher value share in Tier 1 cities (44%) compared to Tier 2 cities (31%) *(Exhibit 2.2).*
- Comparatively, MNCs have seen slightly more share decline in Tier 1 cities.

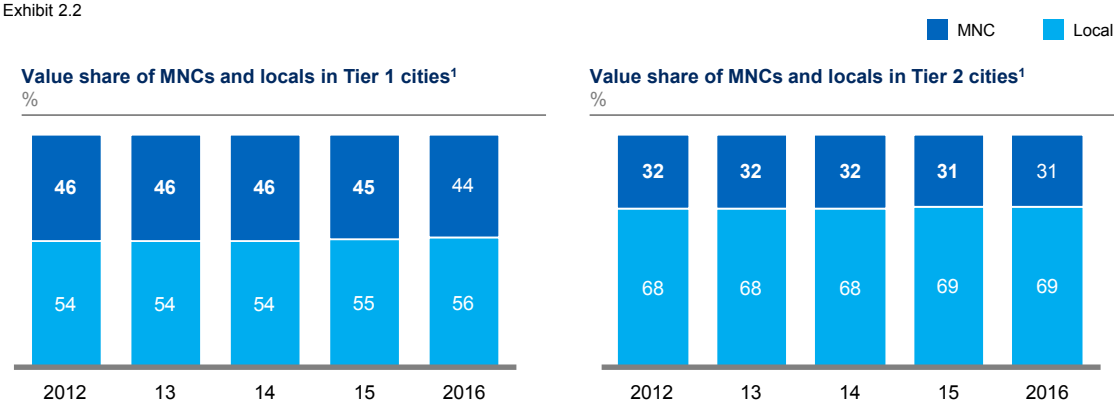
Exhibit 2.1



1 Based on data from 737 sample hospitals in 30 provinces which have continuous data from 2012

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Exhibit 2.2



1 Based on data from 737 sample hospitals in 30 provinces which have continuous data from 2012

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Among sample hospitals, most of the top 10 manufacturers are MNCs. The value share of the top 10 manufacturers remained stable at around 22%, from 2015 through 2016:

- Six of the top 10 manufacturers are MNCs.
- The ranking has remained mostly the same from 2015 to 2016, with the exception of Hengrui and Bayer, both of which moved up 1 place from number 7 to number 6, and from number 9 to number 8, respectively *(Exhibit 2.3)*.
- The top 10 manufacturers have a slightly higher value share at Class III hospitals (about 22%) compared to Class II hospitals (about 20%) *(Exhibit 2.4)*.
- MNCs hold more top 10 slots in Class III hospitals than Class II hospitals. Local companies see a wider variation in ranking. For instance, Shandong Qilu ranks third in Class III hospitals, but 10th in Class II. Similarly, CR Pharma ranks fifth in Class II hospitals, but 15th in Class III *(Exhibit 2.4)*.

Exhibit 2.3

■ MNC ▲ Local

Value Share of Top 10 Manufacturers at sample hospitals in 2015[1]

		企业	Manufacturer	Value share 2015
1	■	辉瑞制药	Pfizer	3.1%
2	■	阿斯利康	AstraZeneca	2.5%
3	▲	山东齐鲁	Shandong Qilu	2.4%
4	▲	扬子江药业	Yangtze River	2.1%
5	■	赛诺菲	Sanofi	2.1%
6	■	诺华制药	Novartis	2.0%
7	▲	江苏恒瑞	Hengrui	1.9%
8	■	罗氏制药	Roche	1.8%
9	■	拜耳	Bayer	1.8%
10	▲	四环医药	Sihuan Pharma	1.7%
		其他	Others	78.6%

Value Share of Top 10 Manufacturers at sample hospitals in 2016[1]

		企业	Manufacturer	Value share 2016
1	■	辉瑞制药	Pfizer	3.2%
2	■	阿斯利康	AstraZeneca	2.5%
3	▲	山东齐鲁	Shandong Qilu	2.3%
4	▲	扬子江药业	Yangtze River	2.2%
5	■	赛诺菲	Sanofi	2.1%
6	▲	江苏恒瑞	Hengrui	2.1%
7	■	诺华制药	Novartis	1.9%
8	■	拜耳	Bayer	1.8%
9	■	罗氏制药	Roche	1.7%
10	▲	四环医药	Sihuan Pharma	1.7%
		其他	Others	78.5%

1 Based on data from 1,029 sample hospitals in 31 provinces

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Exhibit 2.4

■ MNC ▲ Local

Value Share of Top 10 Manufacturers at Class III hospitals[1]

		企业	Manufacturer	Value share 2015	Value share 2016
1	■	辉瑞制药	Pfizer	3.2%	3.2%
2	■	阿斯利康	AstraZeneca	2.5%	2.5%
3	▲	山东齐鲁	Shandong Qilu	2.5%	2.4%
4	▲	扬子江药业	Yangtze River	2.0%	2.2%
5	▲	江苏恒瑞	Hengrui	2.0%	2.1%
6	■	赛诺菲	Sanofi	2.1%	2.1%
7	■	诺华制药	Novartis	2.1%	2.0%
8	■	罗氏制药	Roche	2.0%	1.9%
9	■	拜耳	Bayer	1.8%	1.8%
10	▲	四环医药	Sihuan Pharma	1.7%	1.7%
		其他	Others	78.1%	78.0%

Value Share of Top 10 Manufacturers at Class II hospitals[1]

		企业	Manufacturer	Value share 2015	Value share 2016
1	▲	扬子江药业	Yangtze River	2.7%	2.9%
2	■	辉瑞制药	Pfizer	2.7%	2.8%
3	■	阿斯利康	AstraZeneca	2.0%	2.1%
4	■	赛诺菲	Sanofi	1.9%	1.9%
5	▲	华润医药	CR Pharma	1.8%	1.8%
6	▲	复星医药	Fosun	1.8%	1.8%
7	■	拜耳	Bayer	1.8%	1.7%
8	▲	四环医药	Sihuan Pharma	1.6%	1.7%
9	▲	上药集团	Shanghai Pharma	1.5%	1.5%
10	▲	山东齐鲁	Shandong Qilu	1.5%	1.5%
		其他	Others	80.6%	80.3%

1 Based on data from 1,029 sample hospitals in 31 provinces

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

MNCs lead the market in relatively developed areas: *(Exhibit 2.5, 2.6)*

- In Beijing, Guangdong, and Zhejiang, 7 or more of the Top 10 manufacturers are MNCs, which are also ranked in top positions compared to local players. Moreover, the top 10 manufacturers are evenly distributed in Shanghai with 5 locals and 5 MNCs, with the MNCs taking the top positions.

At the same time, local pharmaceutical manufacturers often display a strong presence in their home markets. Some leading locals even occupy top positions in several provinces: *(Exhibit 2.5, 2.6)*

- Harbin Pharma and Medisan together hold more than 5% of the value share in Heilongjiang, but hold less than 2% share in other provinces.
- Two local manufacturers showed consistent dominance in several provinces. Shandong Qilu ranked number 1 in 5 provinces: Shandong, Hunan, Jiangxi, Liaoning, and Tibet, while Yangtze River leads in 6 provinces: Anhui, Gansu, Jiangsu, Henan, Yunnan, and Shanxi.
- Sihuan Pharma has become one of the most notable players in 2016, with top positions in 7 provinces: Hainan, Heilongjiang, Hubei, Jilin, Ningxia, Qinghai, and Shanxi.
- MNCs often face more fierce competition with local players on their "home turf", compared to competition from local companies at the national level.

Exhibit 2.5

■ MNC ▲ Local

Value share of Top 10 manufacturers in selected provinces[1]

东部 Eastern

上海 Shanghai

		企业	Manufacturer	Value share 2015	Value share 2016
1	■	辉瑞制药	Pfizer	3.5%	3.5%
2	▲	江苏恒瑞	Hengrui	2.4%	2.6%
3	■	阿斯利康	AstraZeneca	2.6%	2.5%
4	■	罗氏制药	Roche	2.5%	2.5%
5	▲	上药集团	Shanghai Pharma	2.2%	2.3%
6	■	诺华制药	Novartis	2.5%	2.2%
7	■	赛诺菲	Sanofi	2.3%	2.1%
8	▲	山东齐鲁	Shandong Qilu	2.0%	2.0%
9	▲	正大集团	Chia-Tai	1.5%	1.7%
10	▲	常州四药	Changzhou Siyao	1.9%	1.7%
		前十大	Top 10 total	23.4%	23.1%

江苏 Jiangsu

		企业	Manufacturer	Value share 2015	Value share 2016
1	▲	扬子江药业	Yangtze River	3.9%	4.1%
2	■	辉瑞制药	Pfizer	3.0%	3.0%
3	▲	山东齐鲁	Shandong Qilu	3.1%	2.9%
4	▲	正大集团	Chia-Tai	2.9%	2.8%
5	▲	江苏恒瑞	Hengrui	2.6%	2.7%
6	■	阿斯利康	AstraZeneca	2.5%	2.6%
7	■	赛诺菲	Sanofi	1.9%	1.9%
8	■	诺华制药	Novartis	2.1%	1.8%
9	▲	江苏豪森	Hansoh	1.7%	1.8%
10	■	拜耳	Bayer	1.6%	1.7%
		前十大	Top 10 total	25.4%	25.2%

浙江 Zhejiang

		企业	Manufacturer	Value share 2015	Value share 2016
1	■	辉瑞制药	Pfizer	5.1%	4.8%
2	■	阿斯利康	AstraZeneca	3.9%	3.6%
3	■	赛诺菲	Sanofi	3.1%	3.3%
4	■	费森尤斯	Fresenius	2.8%	3.0%
5	■	默沙东	MSD	2.8%	2.5%
6	▲	山东齐鲁	Shandong Qilu	2.3%	2.4%
7	■	诺华制药	Novartis	2.3%	2.1%
8	▲	正大集团	Chia-Tai	1.9%	1.8%
9	▲	江苏恒瑞	Hengrui	1.5%	1.7%
10	■	罗氏制药	Roche	1.8%	1.6%
		前十大	Top 10 total	27.3%	26.7%

山东 Shandong

		企业	Manufacturer	Value share 2015	Value share 2016
1	▲	山东齐鲁	Shandong Qilu	6.2%	6.4%
2	▲	江苏恒瑞	Hengrui	2.4%	2.7%
3	■	阿斯利康	AstraZeneca	2.4%	2.5%
4	■	辉瑞制药	Pfizer	2.4%	2.4%
5	▲	扬子江药业	Yangtze River	2.1%	2.2%
6	■	罗氏制药	Roche	2.1%	2.1%
7	▲	正大集团	Chia-Tai	1.8%	2.0%
8	■	诺华制药	Novartis	2.0%	2.0%
9	■	费森尤斯	Fresenius	1.6%	1.7%
10	■	拜耳	Bayer	1.6%	1.7%
		前十大	Top 10 total	24.6%	25.9%

1 Based on data from 1,029 sample hospitals in 31 provinces

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Exhibit 2.6

■ MNC ▲ Local

北部 Northern

北京 Beijing

	企业	Manufacturer	Value share 2015	Value share 2016
1	■ 辉瑞制药	Pfizer	4.8%	4.8%
2	■ 赛诺菲	Sanofi	3.5%	3.4%
3	■ 罗氏制药	Roche	3.3%	3.3%
4	■ 拜耳	Bayer	3.2%	3.0%
5	■ 阿斯利康	AstraZeneca	3.1%	2.9%
6	■ 诺华制药	Novartis	3.0%	2.8%
7	■ 默沙东	MSD	2.7%	2.7%
8	▲ 华润医药	CR Pharma	1.9%	2.1%
9	▲ 山东齐鲁	Shandong Qilu	1.8%	2.0%
10	■ 费森尤斯	Fresenius	1.7%	1.8%
	前十大	Top 10 total	29.1%	28.8%

黑龙江 Heilongjiang

1	▲ 四环制药	Sihuan Pharma	3.8%	3.4%
2	▲ 扬子江药业	Yangtze River	2.1%	2.4%
3	▲ 哈尔滨三联药业	Medisan	2.1%	2.2%
4	▲ 哈药集团	Harbin Pharma	2.7%	2.0%
5	▲ 北京双鹭	SLPharma	1.8%	2.0%
6	▲ 江苏恒瑞	Hengrui	1.8%	1.9%
7	■ 阿斯利康	AstraZeneca	1.9%	1.9%
8	▲ 黑龙江省珍宝岛制药	Heilongjiang ZBD Pharma	1.8%	1.7%
9	▲ 正大集团	Chia-Tai	1.9%	1.7%
10	■ 辉瑞制药	Pfizer	1.6%	1.6%
	前十大	Top 10 total	21.4%	20.9%

辽宁 Liaoning

1	▲ 山东齐鲁	Shandong Qilu	2.6%	2.8%
2	▲ 四环医药	Sihuan Pharma	2.3%	2.8%
3	▲ 扬子江药业	Yangtze River	2.2%	2.4%
4	▲ 江苏恒瑞	Hengrui	2.2%	2.3%
5	■ 辉瑞制药	Pfizer	2.4%	2.3%
6	■ 拜耳	Bayer	2.1%	2.1%
7	■ 阿斯利康	AstraZeneca	1.9%	1.8%
8	▲ 复星医药	Fosun Pharma	2.1%	1.8%
9	■ 诺华制药	Novartis	1.8%	1.7%
10	■ 赛诺菲	Sanofi	1.5%	1.5%
	前十大	Top 10 total	21.1%	21.5%

中南部 Central and Southern

广东 Guangdong

1	■ 辉瑞制药	Pfizer	4.2%	4.2%
2	■ 赛诺菲	Sanofi	3.0%	3.1%
3	■ 阿斯利康	AstraZeneca	3.0%	3.1%
4	■ 诺华制药	Novartis	3.2%	2.9%
5	■ 罗氏制药	Roche	2.8%	2.8%
6	■ 拜耳	Bayer	2.0%	2.1%
7	▲ 扬子江药业	Yangtze River	1.4%	1.6%
8	▲ 华润医药	CR Pharma	1.6%	1.6%
9	■ 百时美施贵宝	BMS	1.7%	1.6%
10	▲ 山东齐鲁	Shandong Qilu	1.6%	1.5%
	前十大	Top 10 total	24.5%	24.5%

河南 Henan

1	▲ 扬子江药业	Yangtze River	3.4%	3.5%
2	▲ 江苏恒瑞	Hengrui	2.6%	2.9%
3	■ 辉瑞制药	Pfizer	1.9%	2.2%
4	▲ 科伦药业	Kelun	2.3%	2.1%
5	▲ 山东齐鲁	Shandong Qilu	2.2%	2.1%
6	■ 阿斯利康	AstraZeneca	1.7%	1.9%
7	▲ 复星医药	Fosun Pharma	1.8%	1.8%
8	▲ 国药集团	Sinopharm	1.8%	1.7%
9	▲ 正大集团	Chia-Tai	1.4%	1.7%
10	■ 罗氏制药	Roche	1.4%	1.3%
	前十大	Top 10 total	20.4%	21.2%

湖南 Hunan

1	▲ 山东齐鲁	Shandong Qilu	4.0%	3.7%
2	▲ 扬子江药业	Yangtze River	3.7%	3.7%
3	▲ 复星医药	Fosun Pharm	3.3%	3.1%
4	▲ 江苏恒瑞	Hengrui	3.1%	2.8%
5	▲ 科伦药业集团	Kelun	2.8%	2.8%
6	▲ 正大集团	Chia-Tai	1.7%	1.8%
7	▲ 四环制药	Sihuan Pharma	1.8%	1.8%
8	■ 辉瑞制药	Pfizer	1.7%	1.8%
9	■ 阿斯利康	AstraZeneca	1.8%	1.8%
10	▲ 上药集团	Shanghai Pharma	1.6%	1.6%
	前十大	Top 10 total	25.4%	24.7%

西部 Western

四川 Sichuan

1	▲ 科伦药业	Kelun	3.7%	3.8%
2	■ 阿斯利康	AstraZeneca	3.7%	3.7%
3	■ 辉瑞制药	Pfizer	3.4%	3.2%
4	▲ 江苏恒瑞	Hengrui	2.5%	2.7%
5	■ 赛诺菲	Sanofi	2.5%	2.4%
6	▲ 扬子江药业	Yangtze River	2.5%	2.4%
7	■ 诺华制药	Novartis	2.0%	2.1%
8	▲ 复星医药	Fosun Pharma	2.4%	1.8%
9	■ 拜耳	Bayer	1.7%	1.7%
10	▲ 山东齐鲁	Shandong Qilu	1.8%	1.7%
	前十大	Top 10 total	26.0%	25.6%

云南 Yunnan

1	▲ 扬子江药业	Yangtze River	3.5%	4.3%
2	■ 辉瑞制药	Pfizer	2.6%	3.0%
3	▲ 复星医药	Fosun Pharma	2.4%	2.3%
4	■ 阿斯利康	AstraZeneca	2.1%	2.2%
5	▲ 山东齐鲁	Shandong Qilu	1.8%	2.1%
6	▲ 科伦药业	Kelun	2.1%	2.1%
7	■ 赛诺菲	Sanofi	2.1%	2.0%
8	▲ 丽珠医药	Livzon	1.6%	1.9%
9	▲ 江苏恒瑞	Hengrui	1.5%	1.8%
10	▲ 哈尔滨三联药业	Medisan	1.5%	1.7%
	前十大	Top 10 total	21.3%	23.5%

1 Based on data from 1,029 sample hospitals in 31 provinces

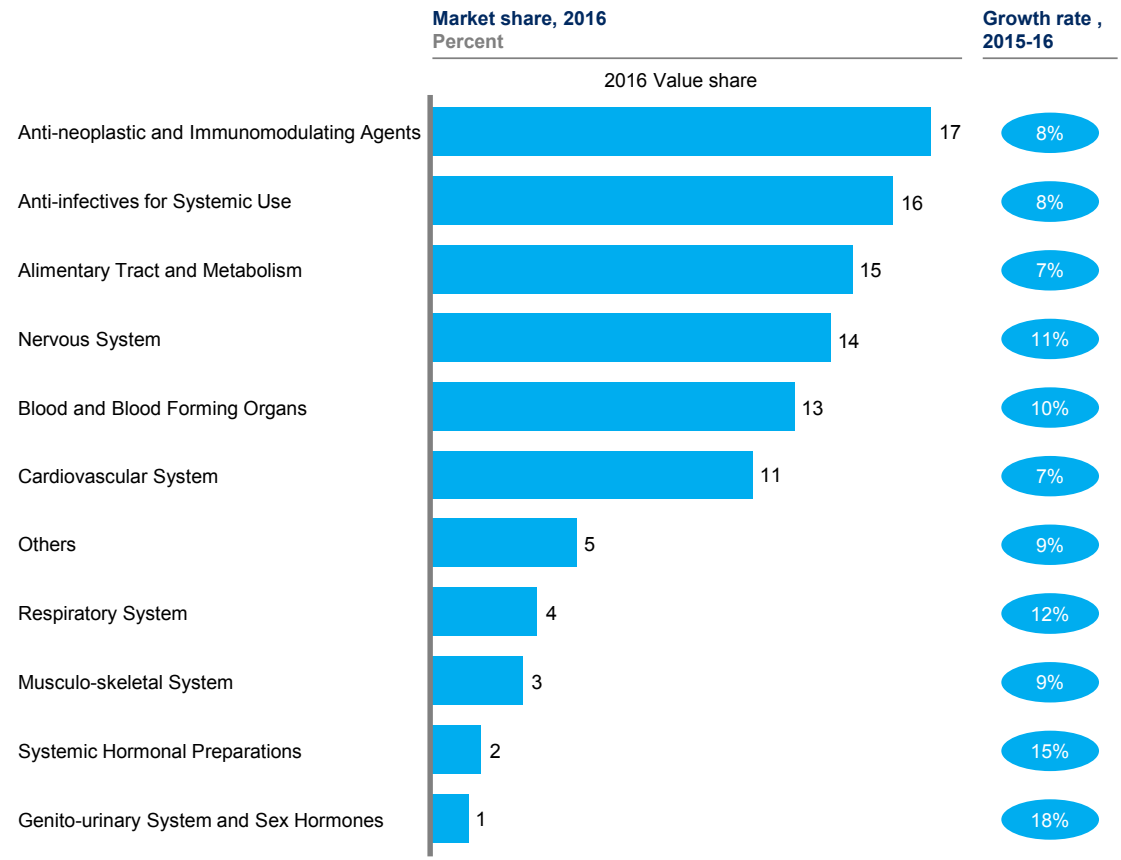
SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

For the major therapeutic areas (TAs), value share and ranking generally remained stable from 2015 to 2016: *(Exhibit 2.7)*

- Anti-neoplastic and Immunomodulating Agents, Anti-infectives for Systemic Use, and Alimentary Tract and Metabolism are the three largest TAs, with a combined 48% market share and moderate growth.
- Nervous System and Blood and Blood Forming Organs hold 14% and 13% share, respectively, and experienced higher growth among top TAs.
- Systemic Hormonal Preparations and Genito-urinary System and Sex Hormones experienced highest growth rates, albeit from a smaller base.

Exhibit 2.7

Value share for major therapeutic areas at sample hospitals[1]



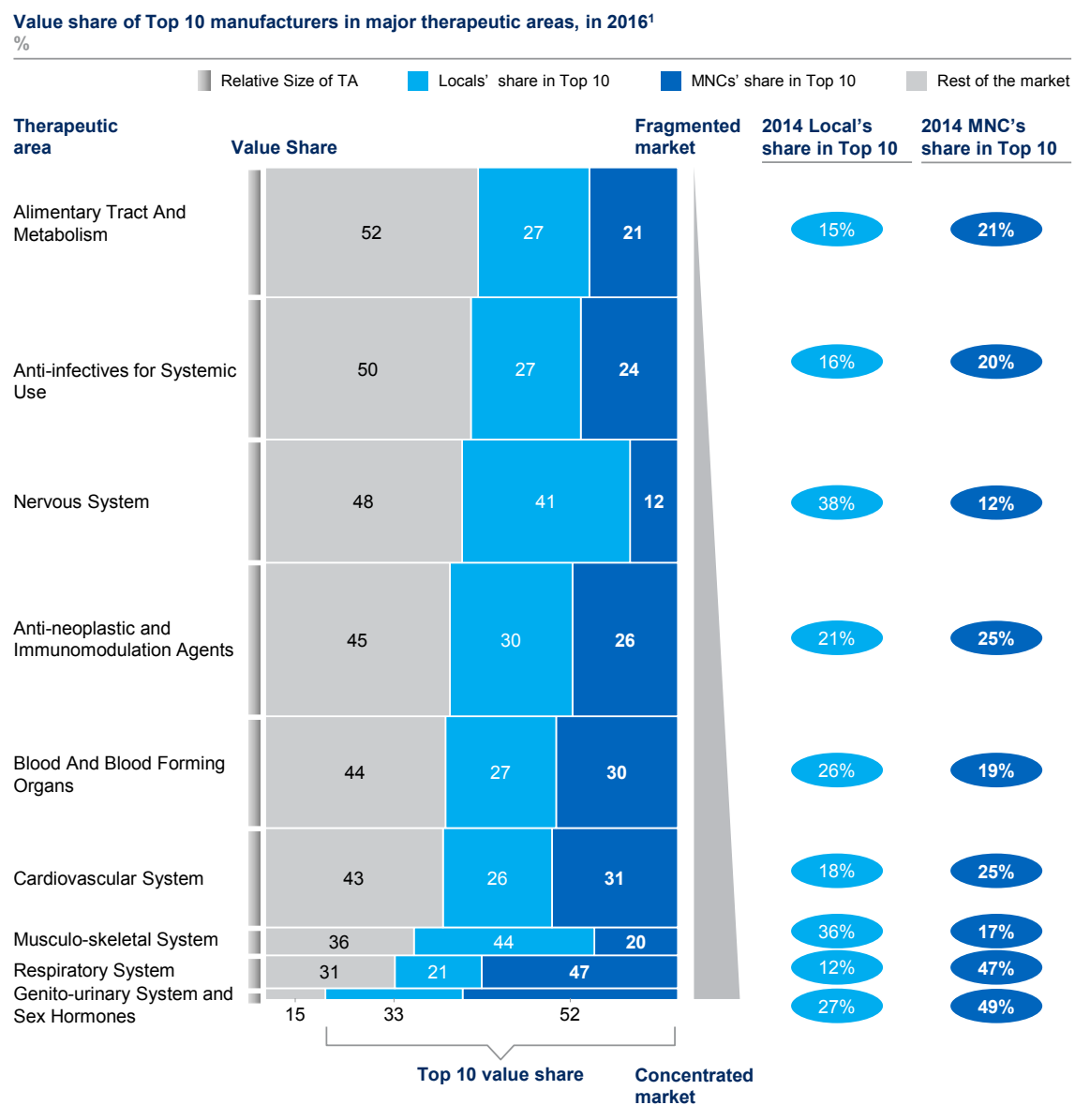
1 Based on data from 1,169 sample hospitals in 31 provinces

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

The value share of the Top 10 manufacturers differs significantly by therapeutic area: *(Exhibit 2.8)*

- Overall, the value shares of the top 10 manufacturers for both MNCs and locals have increased, resulting in a less fragmented market.
- The top 10 manufacturers are most dominant in the Genito-urinary System and Sex Hormone and Respiratory System areas, where they have value shares of approximately 68% and 71%, respectively. Additionally, in these two TAs, MNCs have a much greater value share than local companies.
- The Alimentary Track and Metabolism is the most fragmented TA, with the top 10 only having a 48% share.
- In the Nervous System area, MNCs in the top 10 have the lowest value share at 12%, while locals have a 41% share.

Exhibit 2.8



1 Based on data from 1,169 sample hospitals in 31 provinces

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Section III: Innovative drugs market deep-dive

Scope of our report for Section III

- In this section of the report, we examined a series of innovative drugs in the hospital channel and their launch performance in China.
- The innovative drugs mentioned throughout this section are defined as the originator drugs with only 1 valid CFDA registrant at the year of launch.
- The series of innovative drugs examined in this section were launched during the year period 2010-2012 (according to the CFDA NDA approval date, which allows at least 4 full years of available post-launch sales data), and there were a total of 24 drugs.
- Among these 24 innovative drugs, 2 drugs are from local manufacturers and the remaining 22 drugs are from MNCs.
- The analysis discussed in this section is based on the actual pharmaceutical expenditure data of these 24 drugs at 688 continuous sample hospitals from 2011 to 2016, which includes 468 class III hospitals and 220 Class II hospitals.
- Overall, the innovative drug sales through the sample hospitals only represents roughly one third of the total innovative drug market in the hospital channel.
- The therapeutic area (TA) mentioned throughout this section is defined as the level 2 code of ATC classification based on WHO. Each ATC level 2 code corresponds to one TA, e.g., L01 corresponds to Oncology (Anti-neoplastic agents). See Appendix 3 for the full list of TA classification.

Innovative drug classification

- The 24 Innovative drugs examined in this report are categorized into two different groups: specialty care drugs and primary care/chronic disease drugs.
- Specialty care drugs and primary care/chronic disease drugs classifications are based on the definitions used by industry players, insurers, and medical practitioners.
- The criteria for specialty care drug classification includes:
  - Higher treatment costs, e.g., > RMB 1,000 per month.
  - High complexity drugs to treat complex or rare diseases, e.g., cancer, RA, etc.
  - Requires special handling, administration, and monitoring.
  - Biological drugs.

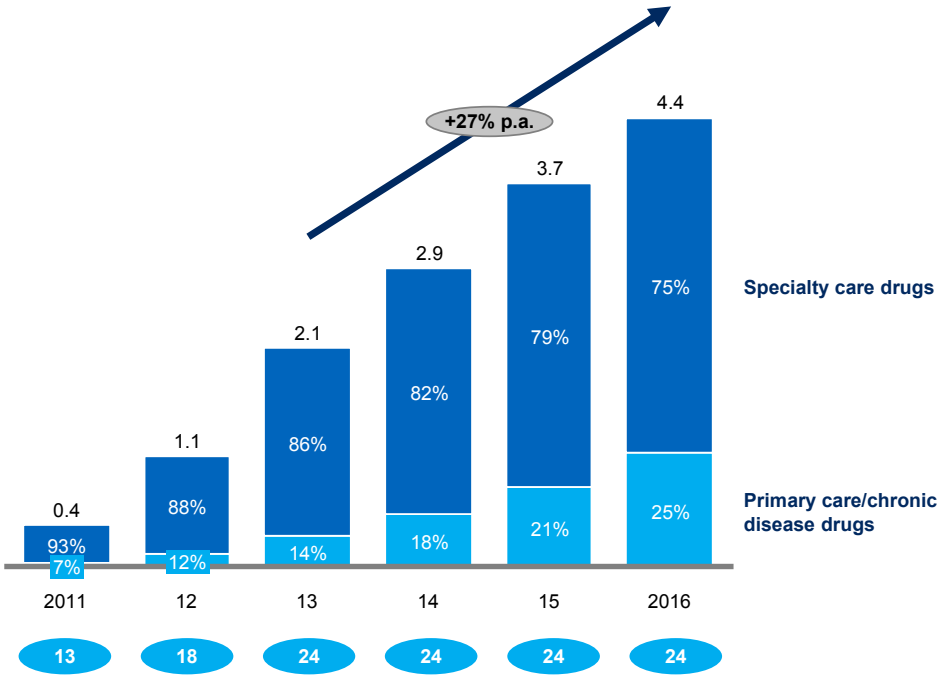
- Criteria for primary care/chronic disease drug categorization includes:
  - Lower treatment costs, e.g., < RMB 1,000per month.
  - Drugs treating diseases with long-lasting, chronic conditions, e.g., diabetes, cardiovascular diseases, etc.
- 9 innovative drugs were classified as specialty care drugs, including: Avastin, Conmana, Enbrel, Exjade, Faslodex, Foesteo, Humira, Lucentis, and Sprycel.
- The other 15 innovative drugs were classified as primary care/chronic disease drugs, including: Apidra, Avamys, Avodart, Brilinta, Fosrenol, Galvus , Glakay, Heng Yang, Lyrica, Onbrez, Onglyza, Priligy, Resolor, Talion, and Victoza.

The 24 innovative drugs launched in China between 2010 and 2012, achieved RMB 4.4 billion annual revenue by 2016 in the hospital channel: *(Exhibit 3.1)*

- These innovative drugs achieved a rapid growth of 27% per annum from 2013 to 2016.
- Out of the 24 drugs, 9 are specialty care drugs and account for about 75% value share by 2016, the rest 15 are primary care/chronic disease drugs.

Exhibit 3.1

Sales of 24 innovative drugs in the hospital channel (extrapolated from sample hospitals)[1]
RMB billions



1 Innovative drug market size extrapolated based on pharmaceutical sales of 24 innovative drugs from 688 (2011-2016 continuous) CPA sample hospitals, using ex-trade prices

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Top 10 innovative drug brands account for ~92% of overall innovative drug market in 2016: *(Exhibit 3.2)*

- There were 24 innovative drugs across 16 different TAs launched in the Chinese market between 2010 and 2012.
- The top 3 brands are Avastin, Lucentis, and Conmana, accounting for approximately 70% of value share, with 2 being oncology drugs.
- Two local brands: Conmana and Heng Yangare ranked among the top 10, indicating the strong momentum of emerging local innovation.

Exhibit 3.2

24 innovative drugs launched between 2010-2012

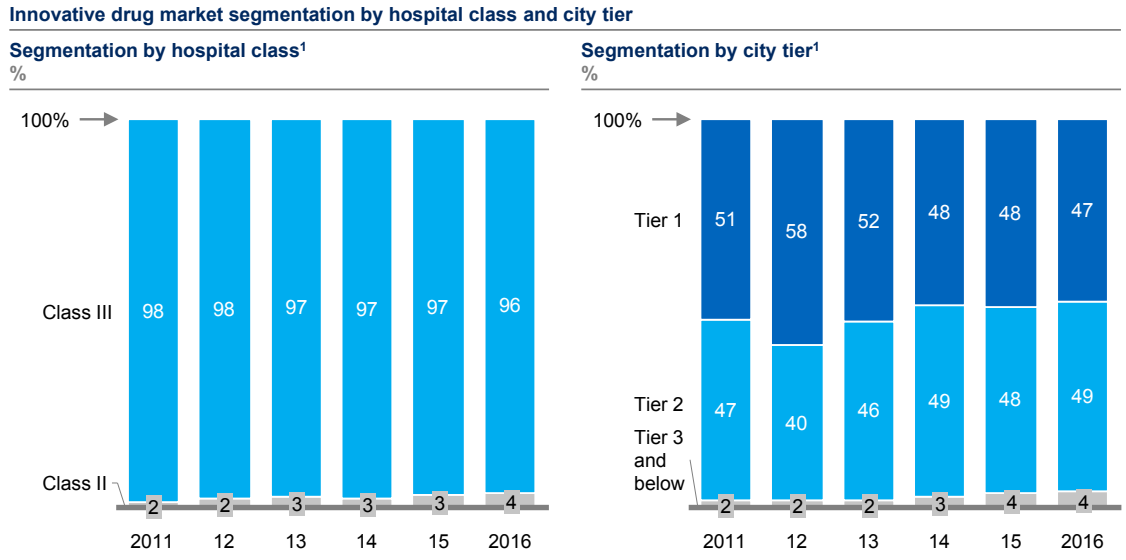
TA (EN)	Manufacturer	Molecule name	Share value of each drug to the total sales of the 24 innovative drugs in 2016 %
Oncology	Roche	Avastin	30.3
Ophthalmological	Novartis	Lucentis	20.3
Oncology	Zhejiang Betta	Conmana	16.6
Antithrombotic	AstraZeneca	Brilinta	9.6
Diabetes	Bristol-Myers Squibb	Onglyza	3.6
Diabetes	Novo Nordisk	Victoza	2.9
Antiepileptic	Pfizer	Lyrica	2.6
Diabetes	Novartis	Galvus	2.1
Anti-inflammatory	Jiangsu Hengrui	Heng Yang	2.1
Endocrine therapy	AstraZeneca	Faslodex	1.9
Oncology	Bristol-Myers Squibb	Sprycel	1.5
Immunosuppressant	Abbott	Humira	1.4
Immunosuppressant	Pfizer	Enbrel	1.3
Other therapeutics	Shire	Fosrenol	1.0
Calcium homeostasis	Eli Lilly	Forsteo	0.8
Muscle relaxants	Mitsubishi Tanabe	Talion	0.6
Other therapeutics	Novartis	Exjade	0.4
Urological	Johnson & Johnson	Priligy	0.3
Anti-constipation	Shire	Resolor	0.2
Bone diseases	Eisai	Glakay	0.2
Diabetes	Sanofi	Apidra	0.1
Obstructive airway	Novartis	Onbrez	0
Urological	GlaxoSmithKline	Avodart	0
Nasal	GlaxoSmithKline	Avamys	0

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

The majority of the assessed innovative drug market is concentrated in top class hospitals and top tier cities: *(Exhibit 3.3)*

- The majority (~96%) of overall innovative drugs were sold through class 3 hospitals, and about 4% were sold through class 2 hospitals.
- Similarly, about 96% of all innovative drugs were sold in tier 1 and tier 2 cities. Tier 3 cities and below, by contrast, only captured about 4% of total sales.
- Early signs of decentralization have been observed with more sales coming from lower tier hospitals and cities. However, slow progress is likely due to affordability constraints.

Exhibit 3.3



1 Based on data of 24 innovative drugs sales from 688 sample hospitals in 28 provinces

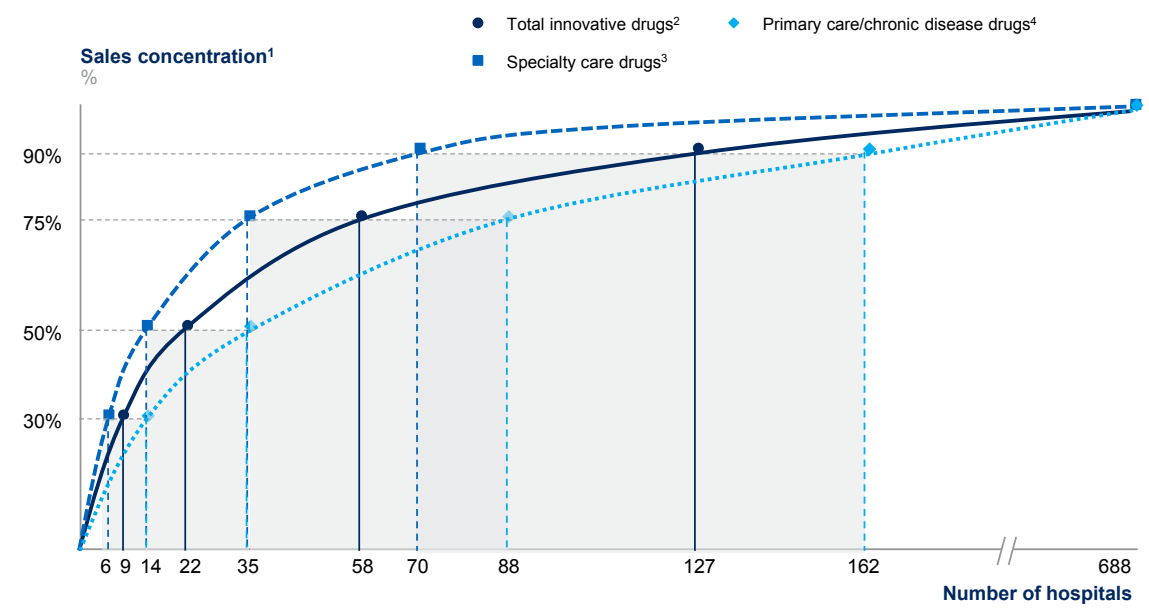
SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Penetration in top hospitals is critical to the innovative drugs: *(Exhibit 3.4)*

- Within CPA sample hospitals, the innovative drug sales are highly concentrated in the largest 162 hospitals in tier 1 and tier 2 cities, especially for specialty care drugs.
- In our 688 sample hospitals, 9 hospitals accounted for about 30% of all innovative drug sales; 22 hospitals accounted for about 50%; 58 hospitals accounted for around 75%; and 127 hospitals accounted for 90% of sales.
- Specialty care drug sales are significantly more concentrated in top hospitals than primary care drugs. For example, 90% of sales come from 70 hospitals for specialty care drugs, whereas for primary care and chronic disease drugs, 90% sales are generated from 162 hospitals.

Exhibit 3.4

2016 sales distribution of innovative drugs across 688 sample hospitals



1 Based on data of 24 innovative drug sales from 688 hospitals in 28 provinces, where 100% of market share is defined as the total innovative drug sales in these 688 hospitals

2 Within 688 sample hospitals, around 160 hospitals reported to have no total innovative drug sales; around 220 hospitals reported to have no primary care/chronic disease innovative drug sales; around 400 hospitals reported to have no specialty care innovative drug sales

3 Within 688 sample hospitals,

4 Within 688 sample hospitals,

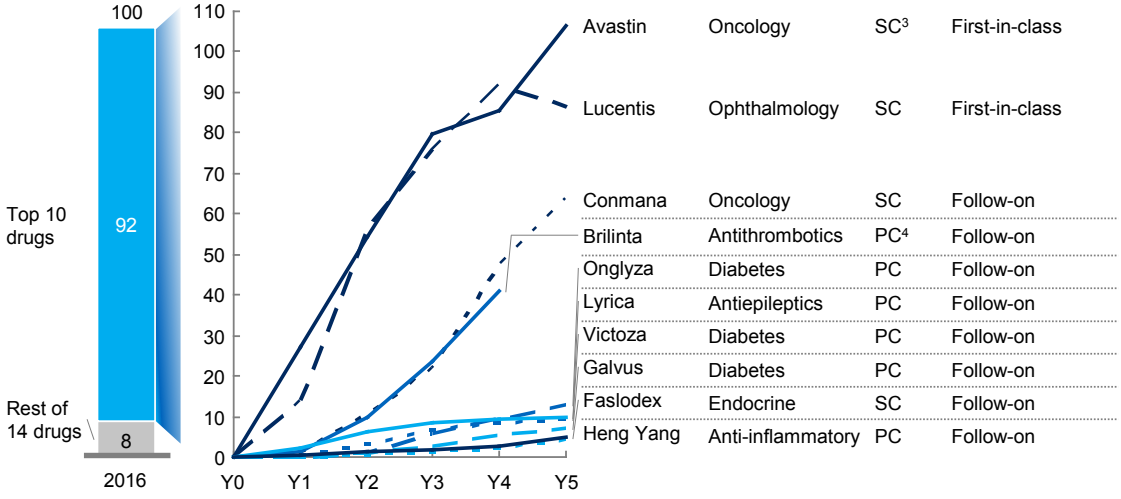
SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

The top 10 brands account for 92% of the total innovative drug market. The top 4 best selling brands, Avastin, Lucentis, Conmana, and Brilinta, significantly outperformed the other 6 brands. A number of reasons may have contributed to their performance *(Exhibit 3.5):*

- All 4 drugs are intended to treat serious life-debilitating conditions, and patients are likely to have a greater willingness to pay.
- All 4 innovative drugs are recommended as first-line therapy in the treatment guidelines of the respective indications.
- The level of innovation might be a crucial driver of launch performance. For example, the top 2 drugs, Avastin and Lucentis, are first-in-class.
- Local innovation is encouraged and supported by the government. For example, Conmana is listed in a number of PRDLs and CDIs.

Exhibit 3.5

Top 10 brands of examined innovative drugs



Brand name	TA[2]	Drug Class	Level of innovation based on US FDA drug approval report[5]
Avastin	Oncology	SC[3]	First-in-class
Lucentis	Ophthalmology	SC	First-in-class
Conmana	Oncology	SC	Follow-on
Brilinta	Antithrombotics	PC[4]	Follow-on
Onglyza	Diabetes	PC	Follow-on
Lyrica	Antiepileptics	PC	Follow-on
Victoza	Diabetes	PC	Follow-on
Galvus	Diabetes	PC	Follow-on
Faslodex	Endocrine	SC	Follow-on
Heng Yang	Anti-inflammatory	PC	Follow-on

1 Assume Sprycel sales at year 1 (Y1) is 1, relative sales of different drugs are plotted
2 ATC level 2
3 SC is specialty care drugs
4 PC is primary care/chronic disease drugs
5 "Follow-on" drugs in US may be a "first-in-class" drug in China, e.g. Victoza is the first GLP-1 launched in China

SOURCE: FDA; Chinese Pharmaceutical Association; NHFPC; McKinsey analysis

In this report, we have differentiated innovative drug launches into "leading launches" and "other launches" based on their sales value ranking in 2016.

- Innovative drugs are first categorized by specialty care and primary care/chronic disease.
- The top 20% of specialty care and primary care/chronic disease drugs are defined as "leading launches." Among 24 innovative drugs, we identified 5 "leading launches": 2 in specialty care and 3 in primary care/chronic disease drugs.

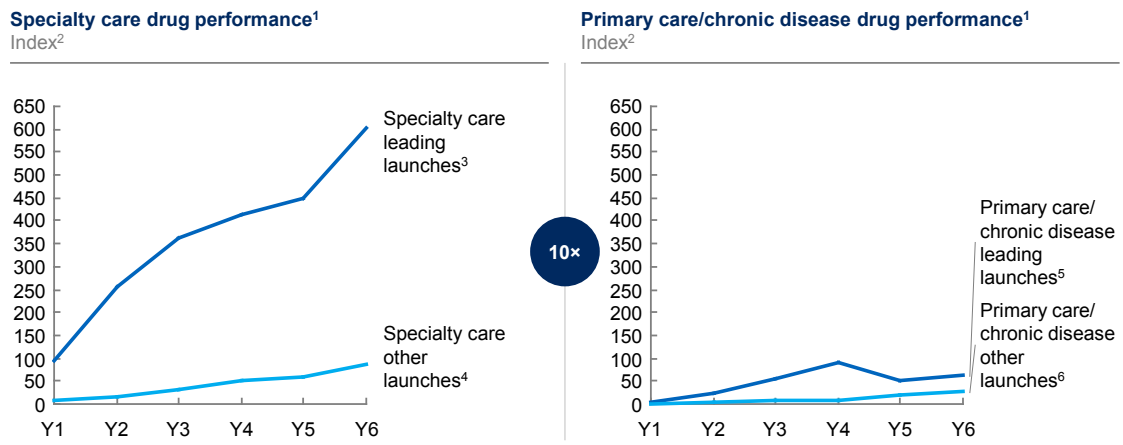
Classification of innovative drugs based on launch performance

	Leading launches	Other launches		
Specialty care drugs	Avastin Lucentis	Conmana Enbrel Exjade Faslodex	Foesteo Humira Sprycel	
Primary care/ chronic disease drugs	Brilinta Onglyza Victoza	Apidra Avamys Avodart Fosrenol	Galvus Glakay Heng Yang Lyrica	Onbrez Priligy Resolor Talion

For new launches, specialty care innovative drugs perform better than primary care/chronic disease innovative drugs *(Exhibit 3.6)*

- 5-6 years after launch, sales of specialty care leading launches were almost 10 times that of primary care/chronic disease leading launches.
- Specialty care drugs not only performed better for leading launches, specialty care other launches also achieved 3 times the sales of primary care/chronic disease other launches.

Exhibit 3.6



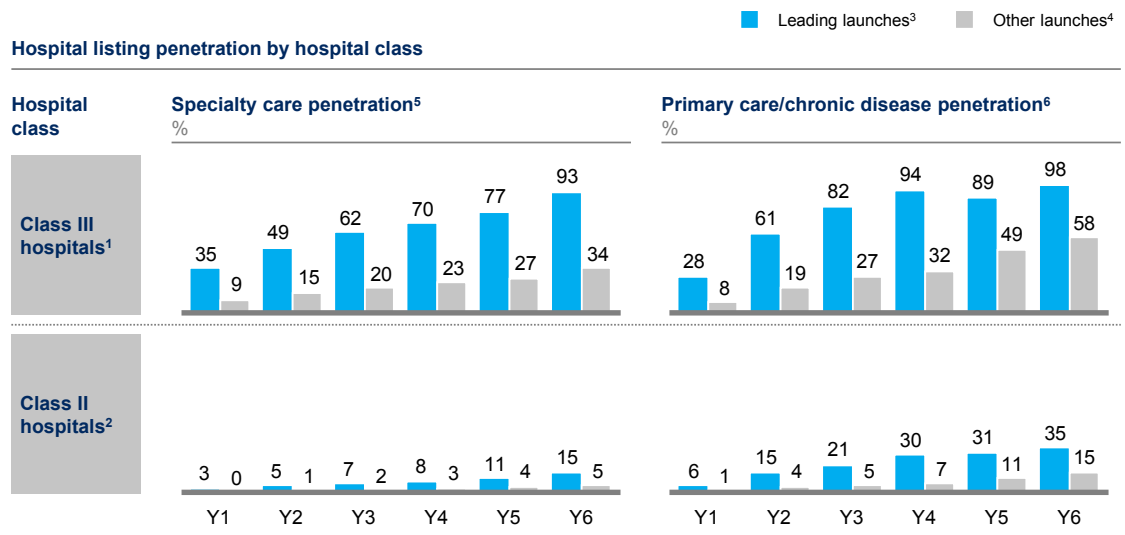
1 Based on data from 688 sample hospitals in 28 provinces
2 Assume baseline sales of Primary care/chronic disease drug other launches at Y1 is 1, the relative sales of other drugs are plotted
3 Defined as top 20% performing specialty care drugs in terms of sales ranking in 2016 (2 drugs)
4 Defined as bottom 80% performing specialty care drugs in terms of sales ranking in 2016 (7 drugs)
5 Defined as top 20% performing primary care/chronic disease drugs in terms of sales ranking in 2016 (3 drugs)
6 Defined as bottom 80% performing primary care/chronic disease drugs in terms of sales ranking in 2016 (12 drugs)

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Hospital listing is a critical factor to the success of launch performance for innovative drugs. The Class III hospital penetration for leading launches far exceeded other launches *(Exhibit 3.7)*:

- Compared to other launches, the leading launches were able to achieve close to 3 times the penetration in Class III hospitals for specialty care, and close to 2 times the penetration for primary care/chronic disease drugs.
- Despite lagging in sales performance, primary care/chronic disease drugs achieved higher penetration compared to specialty care drugs.
- In Class III hospitals, other launches for primary care/chronic disease drugs were able to achieve approximately 70% higher penetration rate than other launches for specialty care drugs (58% vs. 34%). In Class II hospitals, penetration for leading launches of primary care/chronic disease drugs doubled penetration for leading launches of specialty care drugs.

Exhibit 3.7



1 Based on data from 469 Class 3 hospitals in 28 provinces
2 Based on data from 214 Class 2 hospitals in 26 provinces
3 Based on data from top 20% of drugs by sales ranking in 2016
4 Based on data from bottom 80% of drugs by sales in 2016
5 Base on data from 9 specialty drugs
6 Based on data from 15 primary care/chronic disease drugs

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

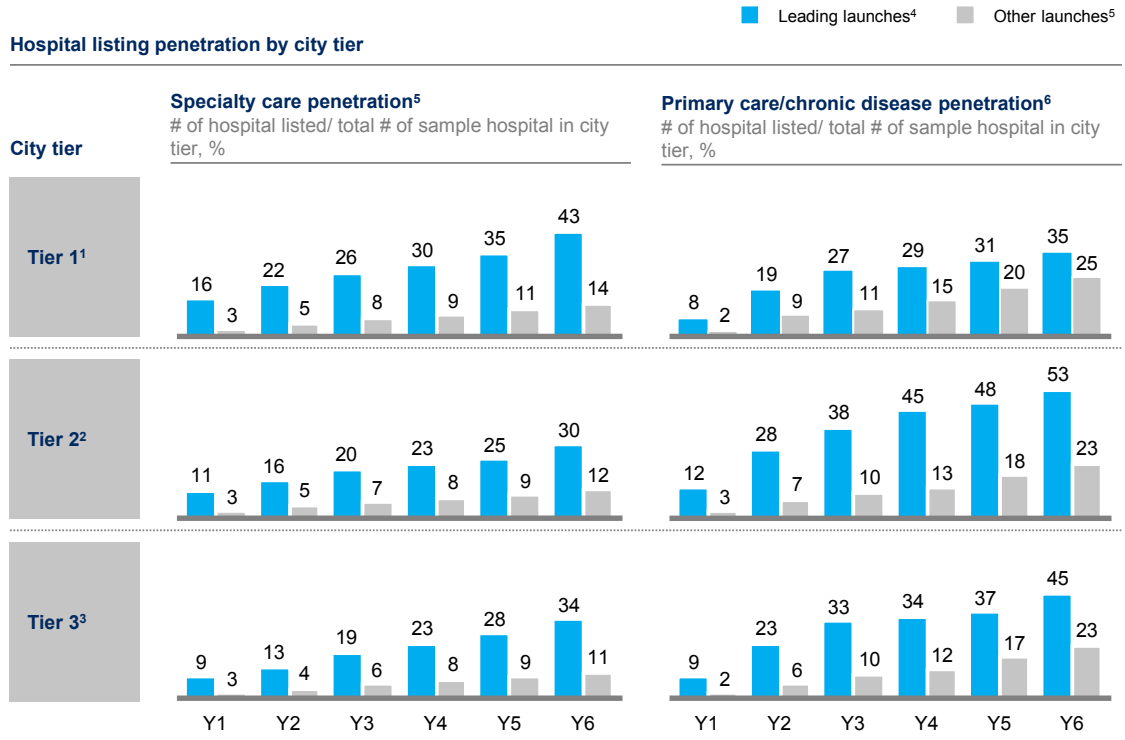
Leading launches have achieved much faster hospital listing penetration as compared to other launches across city tiers *(Exhibit 3.9)*:

- In tier 1 cities, leading launches for specialty care and primary care/chronic disease entered 43% and 35% of the sample hospitals at Year 6 after launch, which are about 300% and 50% higher than penetration of other launches for specialty care and primary care/chronic disease.
- A similar pattern was observed in tier 2 and 3 cities: penetration of leading launches was at least 2 times that of other launches.

Except for leading launches in Tier 1 cities, hospital listing for primary care drugs outpaced specialty care drugs across city tiers, as broader coverage is key to drive growth for primary care drugs *(Exhibit 3.8)*:

- Leading launches for primary care and chronic disease drugs achieved 53% and 45% penetration in tier 2 and 3 cities, respectively, at Year 6 after launch, both of which were 50% higher than penetration of specialty care drugs.
- Other launches for primary care and chronic disease drugs were also able to achieve faster penetration than specialty care drugs across city tiers.

Exhibit 3.8



1 Based on data from 159 Tier 1 city hospitals in 28 provinces
2 Based on data from 417 Tier 2 city hospitals in 28 provinces
3 Based on data from 79 Tier 3 city hospitals in 28 provinces
4 Based on data from 9 specialty drugs
5 Based on data from 15 primary care/chronic disease drugs

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Gaining market share is challenging for innovative drugs in the hospital channel, with only 3 out of 24 innovative drugs managing to gain an incremental TA share of >2% from Year 1 to Year 5 *(Exhibit 3.9):*

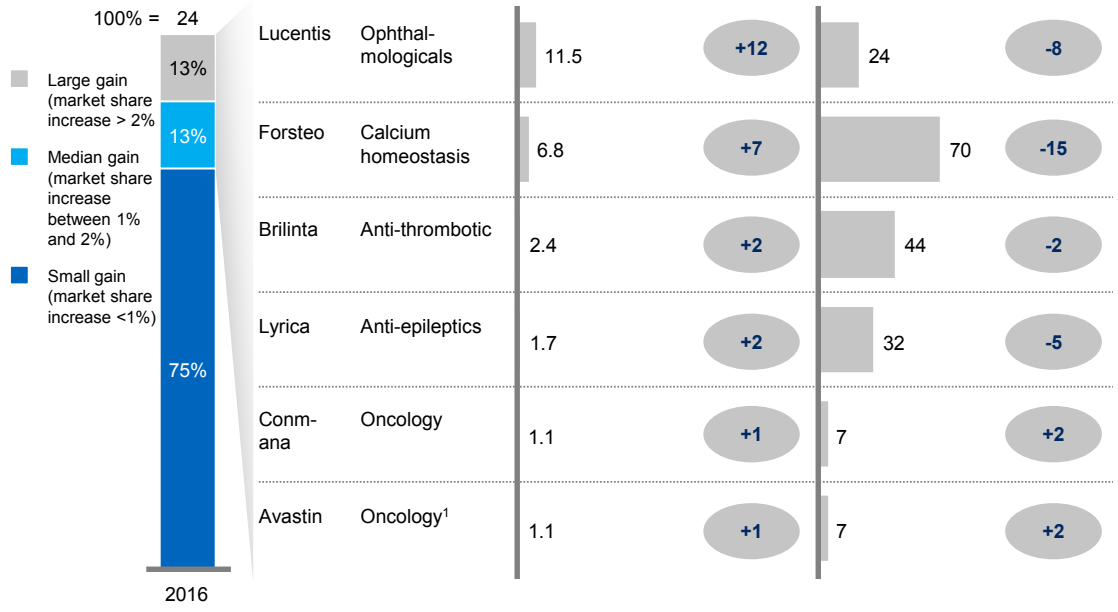
- Despite being innovative or first-in-class drugs in the market, gaining market share is challenging in China.
- Only 3 drugs were able to gain more than 2% market share in 5 years, with each gaining 11.5%, 6.8%, and 2.4%, respectively.
- Another 3 drugs were able to gain more than 1%, but less than 2%. This includes two drugs that gained 1.1% and 1.7%, respectively.
- The remaining 18 drugs were not able to gain more than 1% market share 5 years after launch.

However, the innovative drugs sales through the hospital channel may not represent the total innovative drugs sales in China

- One caveat of the analysis is that the shares only represent the hospital channel and do not include sales from the retail channel.
- Hospitals are under increasing cost containment pressure by healthcare regulators, especially for larger hospital accounts. Some sales might have outflowed to the retail channel, which is more likely to happen with expensive specialty care drugs.

Exhibit 3.9

New launch market share changes within TA from Year 1 to Year 5



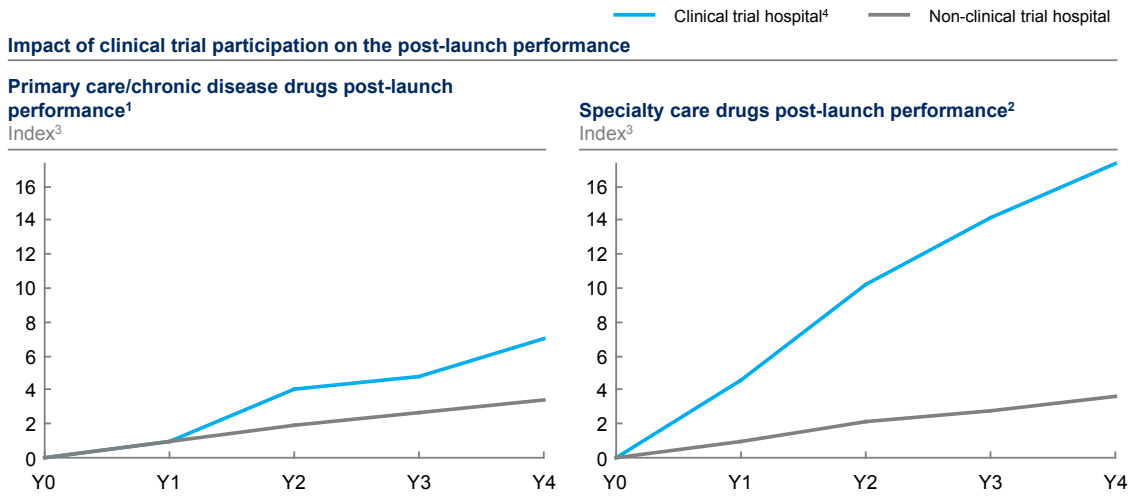
1 Total of 24 innovative drugs were segmented into 3 groups based on market share gain in 5 years, fast growth group is Δ>2% of market share gain in 5 years, steady growth is 1%<Δ<2%, slow growth is Δ<1%
2 TA share is defined as total sales of innovative drug out of their respective total TA (ATC2) sales in 688 sample hospitals
3 The largest old drug is defined as the drug (by molecule name) launched before the innovative drug which has the highest sales in respective TA, they are: Pemetrexed (Oncology), Hyaluronate (Ophthalmologicals), Valproate (anti-epileptics), Calcitonin (Calcium homeostatic), and Clopidogrel (anti-thrombotic)

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Significantly better post launch performance of new drugs was observed in hospitals that were clinical trial sites during the registration process. This indicates the physician participation in trials has boosted their confidence in adopting the new therapy post launch, especially for specialty care drugs *(Exhibit 3.10)*

- Hospitals that participated in clinical trials had better performance in sales value compared to non-clinical trial hospitals.
- The impact of participating in a clinical trial is more profound for specialty care drugs: about 2X for primary care drugs in year 4, and about 5X for specialty drugs in year 4.
- Use of specialty care drugs commonly requires that physicians have a detailed understanding of the therapy (e.g. suitable indication/ sub-population, adverse effects management). Therefore, physicians/medical institutions with previous experience in clinical trials will likely become the forerunners in adopting the new therapy.
- This highlights the importance of the selection and management of participating in clinical trial sites, especially in light of the ongoing CFDA reform.

Exhibit 3.10



1 Based on data from 5 primary care/chronic disease drugs average sales in clinical trial hospitals and non-clinical trial hospitals
2 Based on data from 6 specialty care drugs average sales in clinical trial hospitals and non-clinical trial hospitals
3 Assume non-clinical hospital sales at year 1 (Y1) is 1, relative sales at different years are plotted
4 Clinical trial hospitals were identified based on clinical trials published on www.chinadrugtrials.org.cn, which included all hospitals involved throughout phase 1-3

SOURCE: Chinese Pharmaceutical Association; chinadrugtrials.org.cn; McKinsey analysis

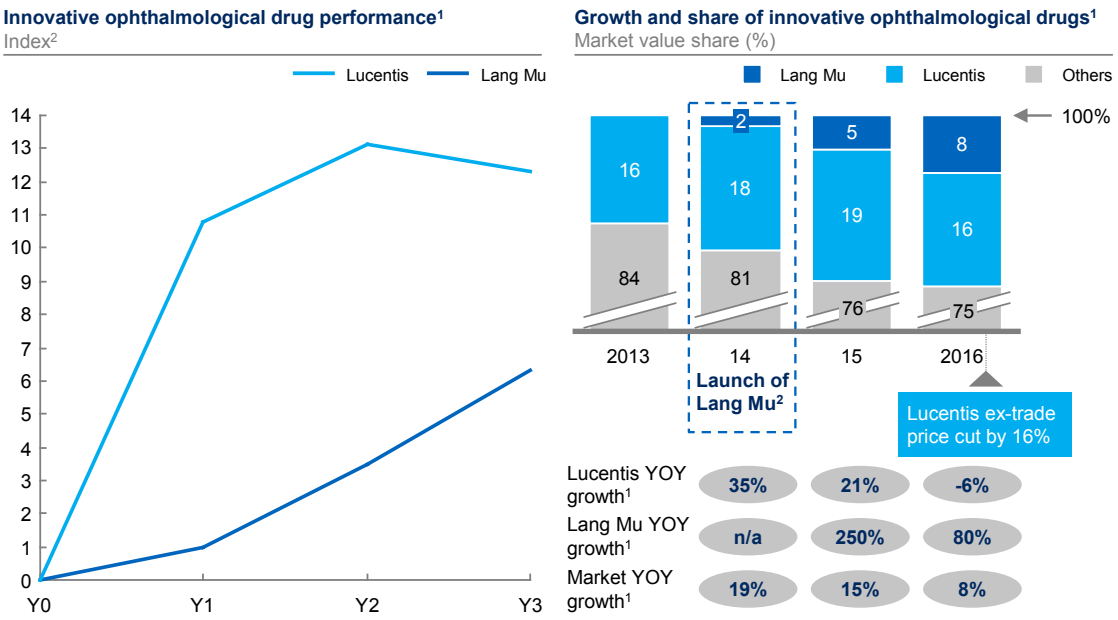
In recent years, China has been catching up on pharmaceutical innovation, and local pharmacos have launched a number innovative products. To understand the dynamics between the MNCs and local players, the launch performance of 2 innovative drugs was examined.

MNC manufacturer Novartis launched Lucentis for AMD treatment in 2012, followed by Lang Mu launched by Chengdu Kong Hong in 2015 *(Exhibit 3.11)*

- Lang Mu was introduced in 2014 at only 2/3 of the price of Lucentis. The two innovative drugs treating AMD grabbed a combined value share of 24% in 2015 and 2016.
- Lang Mu gained value share against Lucentis by 3% from 2015 to 2016, due to the slowdown of volume growth from 21% to 17% in 2016, and an adjusted pricing strategy that saw a 16% price cut in 2016 for Lucentis.
- More intense competition is expected in the innovative drug market, as local players continue to build capabilities in innovation and commercialization.

Exhibit 3.11

Performance of innovative ophthalmological drug (Lucentis v.s. Lang Mu)



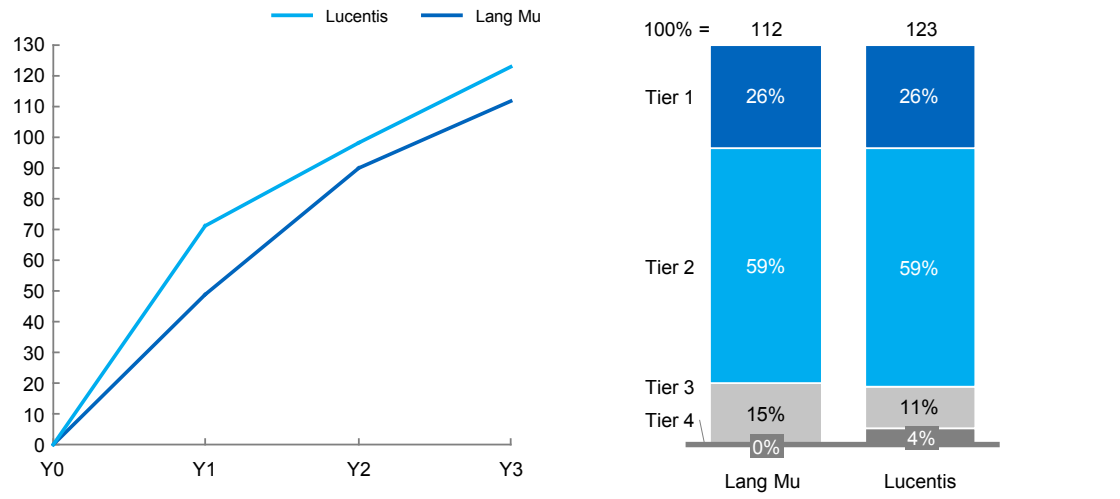
1 Based on 688 sample hospitals in 28 provinces
2 Assume Conbercept (Lang Mu) sales at Y1 is 1, relative sales of other drugs at different years are plotted

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

- Both Novartis, an MNC, and Kong Hong, a local player, displayed similar capability in commercialization and focused on hospitals in tier 1 and tier 2 cities, each with a similar share of about 85% of hospitals in tier 1 and tier 2 cities *(Exhibit 3.12)*.
- Both Novartis and Kong Hong demonstrated very close hospital listing pace in the first 3 years of launch, with Novartis achieving a slightly higher number of hospitals listed (about 123) compared to Kong Hong (about 112) at year 3 *(Exhibit 3.12)*.

Exhibit 3.12

Performance of innovative ophthalmological drug (Lucentis v.s. Lang Mu)



1 Based on 688 sample hospitals in 28 provinces

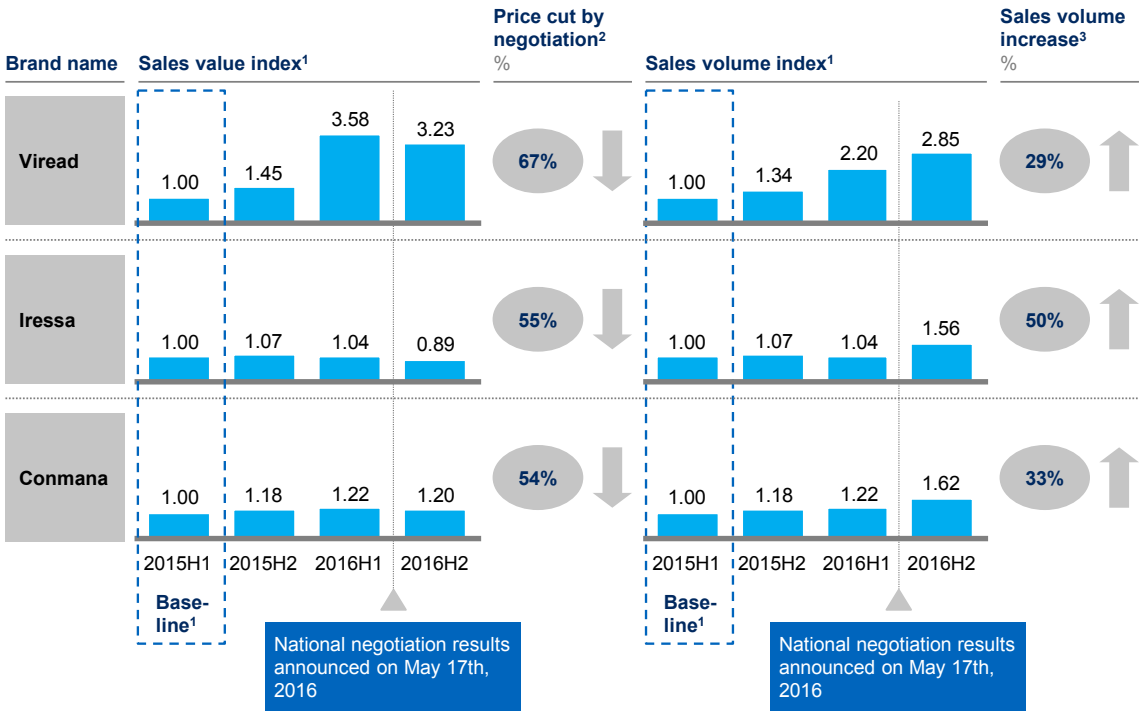
SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

After the significant price cut from national negotiation, three pilot products, Viread, Iressa, and Conmana, experienced a volume uptick but revenue declined in the second half of 2016 in CPA sample hospitals *(Exhibit 3.13)*

- 3 innovative drugs, Viread, Iressa, and Conmana were selected for national negotiation, with a significant price reduction of 67%, 55%, and 54% respectively, as published on May 17th 2016.
- Post price negotiation, sales values of all 3 drugs dropped in the second half of 2016 compared to the first half of the year.
- At the same time, the increase in volume varied among the three products. Sales volume of Iressa significantly increased by 50% in the second half of 2016 compared with the first half, while Conmana and Viread increased by a more modest 33% and 29%, respectively.
- One caveat is that CPA sample hospitals are more concentrated in top class hospitals and top city tier hospitals. Therefore, the sales volume uptick from the lower tier market may not be fully captured.

Exhibit 3.13

Impact of national price negotiation on sales and volume



1 Assume baseline sales at 2015H1 is 1, the relative sales by half-year are calculated and plotted
2 Price cut percentages were calculated from announced price cut by NHFPC, which does not take into consideration of PAP plans
3 Sales volume increase after the national negotiation, e.g. increase from 2016H1 to 2016H2

SOURCE: NHFPC; Chinese Pharmaceutical Association; McKinsey analysis

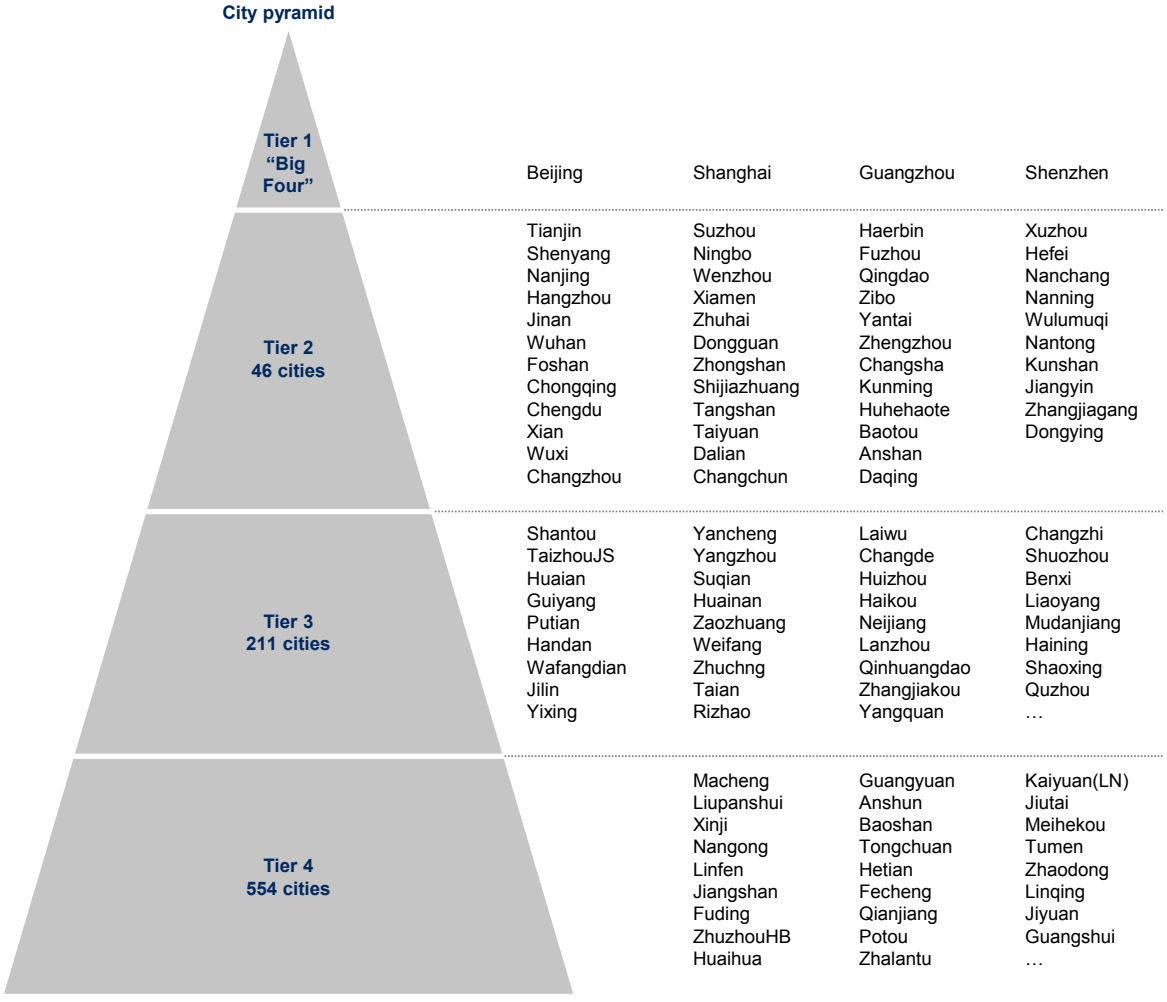
Key perspectives of Section III

- The 24 innovative drugs launched in China between 2010 and 2012 grew at 27% per annum from 2013 to 2016, and reached RMB 4.4 billion annual revenue by 2016 in sample hospitals. Among which, the top 10 innovative drug brands accounted for approximately 92% of sales, and the top 3 brands, Avastin, Lucentis, and Conmana, accounted for about 70% of sales.
- The innovative drug market is heavily concentrated in Class III hospitals and Tier 1 and 2 cities. The ability to penetrate top hospitals and top tier cities remains critical for innovative drug makers.
- Leading launches versus others: For the newly launched innovative drugs, specialty care drugs performed significantly better. For example, the top 3 selling new launch brands, Avastin, Lucentis, and Conmana, are all specialty drugs.
- Hospital listing is critical for successful launches: "Leading launches" have achieved much faster hospital listing penetration as compared to "others" across city tiers. In Class III hospitals, "leading launches" far exceeded the "others". Hospital listing for primary care drugs significantly outpaced specialty care drugs across city tiers, as broader coverage is key to drive growth for primary care drugs.
- Gaining market share within TA is a hard battle: Gaining market share is challenging for innovative drugs in the hospital channel, with only 3 out of 24 innovative drugs managing to gain an incremental TA share of >2% from year 1 to year 5.
- Clinical trial participation accelerates the adoption of new therapies: Significantly better post launch performance of new drugs was observed in hospitals that were clinical trial sites during the registration process. This indicates that physician participation in trials boosted their confidence in adopting the new therapies post launch, especially for specialty care drugs.
- Head-to-head competition between MNC and local innovative therapies: MNC manufacturer Novartis launched Lucentis for AMD treatment in 2012, followed by Lang Mu, launched by Chengdu Kong Hong in 2015. Lang Mu adopted a similar hospital listing strategy to quickly expand coverage and gained share against Lucentis with lower price. Going forward, more intense competition is expected in the innovative drug market, as local players continue to build capabilities in innovation and commercialization.
- National price negotiation leads to significant volume increase but a drop in revenue: After the significant price cut after national negotiation, three pilot products, Viread, Iressa, and Conmana, experienced a volume uptick but a revenue decline in the second half of 2016 in CPA sample hospitals. After the price cut, the boost in sales volume varied among the three products, with Iressa leading with a 50% increase (2016H2 v.s. 2016H1), and Viread and Conmana increasing by about 30%.

Appendix 1: City-tier system

City-tier system introduction

- Under the McKinsey Global Institute city tier system, the 939 Chinese cities (including 649 official cities and 290 city- equivalent counties) are divided into 4 broad tiers based on economic and demographic indicators, such as GDP, population, GDP per capita, disposable income by household, and household consumption.



SOURCE: McKinsey Insights China – Macroeconomic model update (2013); McKinsey Insights China analysis

Appendix 2: Sample hospitals

第一部分，第二部分：1169样本医院区域性分布
Distribution of 1169 sample hospitals by region in Section I & II

	三级医院 Class III	二级医院 Class II	省份举例 Example provinces
东部 Eastern	181	81	上海 Shanghai 浙江 Zhejiang 江苏 Jiangsu 山东 Shandong
北部（含东北[1]） Northern (including Northeastern[1])	248	119	北京 Beijing 黑龙江 Heilongjiang 辽宁 Liaoning
中南部 Central and Southern	200	138	广东 Guangdong 河南 Henan 湖南 Hunan
西部 Western	123	79	四川 Sichuan 重庆 Chongqing 新疆 Xinjiang

第三部分：688样本医院区域性分布
Distribution of 688 sample hospitals by region in Section III

	三级医院 Class III	二级医院 Class II	省份举例 Example provinces
东部 Eastern	123	54	上海 Shanghai 浙江 Zhejiang 江苏 Jiangsu 山东 Shandong
北部（含东北[1]） Northern (including Northeastern[1])	156	66	北京 Beijing 黑龙江 Heilongjiang 辽宁 Liaoning
中南部 Central and Southern	124	63	广东 Guangdong 河南 Henan 湖南 Hunan
西部 Western	66	36	四川 Sichuan 重庆 Chongqing 新疆 Xinjiang

1 Northeastern provinces include Heilongjiang and Liaoning

Appendix 2: Sample hospitals

第三部分：688样本医院城市级别分布
Distribution of 688 sample hospitals by city tier in Section III

	医院数量 Number of hospitals	省份举例 Example provinces
一线城市 Tier 1 cities	159	北京 Beijing 上海 Shanghai 广州 Guangzhou 深圳 Shenzhen
二线城市 Tier 2 cities	417	天津 Tianjin 苏州 Suzhou 南京 Nanjing
三线城市 Tier 3 cities	79	汕头 Shantou 贵阳 Guiyang 吉林 Jilin
四线城市 Tier 4 cities	33	江山 Jiangshan 开原 Kaiyuan 广水 Guangshui

1 Northeastern provinces include Heilongjiang and Liaoning

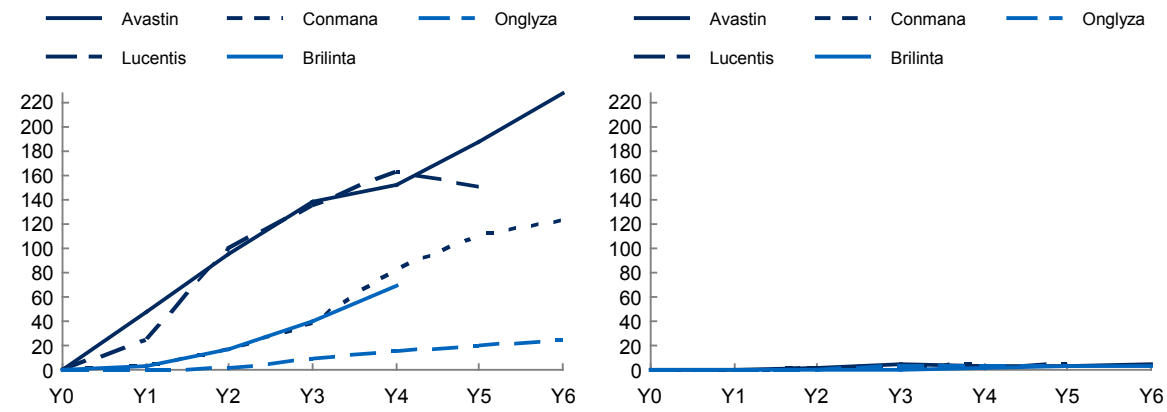
Appendix 3: 24 innovative drugs included in the analysis

通用名	Molecule	Manufacture	Formulation	剂型	Strength/剂量
依那西普	Etanercept	Wyeth	Powder For Injection	注射粉针剂	25 MG
利拉鲁肽	Liraglutide	Novo Nordisk	Injection	注射剂	18 MG 3 ML
四烯甲萘醌	Menatetrenone	Eisai	Capsule	胶囊剂	15 MG
地拉罗司	Deferasirox	Novartis	Tablet	片剂	125 MG
埃克替尼	Icotinib	Zhejiang Betta	Tablet	片剂	125 MG
度他雄胺	Dutasteride	GlaxoSmithKline	Capsule	胶囊剂	500 UG
普瑞巴林	Pregabalin	Pfizer	Capsule	胶囊剂	75 MG
普瑞巴林	Pregabalin	Pfizer	Capsule	胶囊剂	150 MG
普芦卡必利	Prucalopride	Shire	Tablet	片剂	2 MG
替格瑞洛	Ticagrelor	Astrazeneca	Tablet	片剂	90 MG
氟维司群	Fulvestrant	Astrazeneca	Injection	注射剂	250 MG 5 ML
沙格列汀	Saxagliptin	Bristol-Myers Squibb	Tablet	片剂	5 MG
特立帕肽	Teriparatide	Eli Lilly	Injection	注射剂	2.4 ML
碳酸镧	Lanthanum Carbonate	Shire	Tablet	片剂	500 MG
糠酸氟替卡松	Fluticasone Furoate	GlaxoSmithKline	Nasal Spray	鼻用喷雾剂	27.5 UG 3.3 MG
维格列汀	Vildagliptin	Novartis	Tablet	片剂	50 MG
艾瑞昔布	Imrecoxib	Jiangsu Hengrui	Tablet	片剂	100 MG
苯磺贝他斯汀	Bepotastine Besilate	Mitsubishi Tanabe	Tablet	片剂	10 MG
茚达特罗	Indacaterol	Novartis	Powder For Injection	注射粉针剂	150 UG
谷赖胰岛素	Insulin Glulisine	Sanofi	Injection	注射剂	300 IU 3 ML
贝伐珠单抗	Bevacizumab	Roche	Injection	注射剂	100 MG 4 ML
达沙替尼	Dasatinib	Bristol-Myers Squibb	Tablet	片剂	50 MG
达沙替尼	Dasatinib	Bristol-Myers Squibb	Tablet	片剂	20 MG
达泊西汀	Dapoxetine	Johnson & Johnson	Tablet	片剂	30 MG
达泊西汀	Dapoxetine	Johnson & Johnson	Tablet	片剂	60 MG
阿达木单抗	Adalimumab	Abbott	Injection	注射剂	40 MG 0.8 ML
雷珠单抗	Ranibizumab	Novartis	Injection	注射剂	2 MG 0.2 ML
雷珠单抗	Ranibizumab	Novartis	Injection	注射剂	10 MG 1 ML

Appendix 4: Additional analysis

Exhibit Appendix 1

Launch performance of selected innovative drugs in Class III and II hospitals

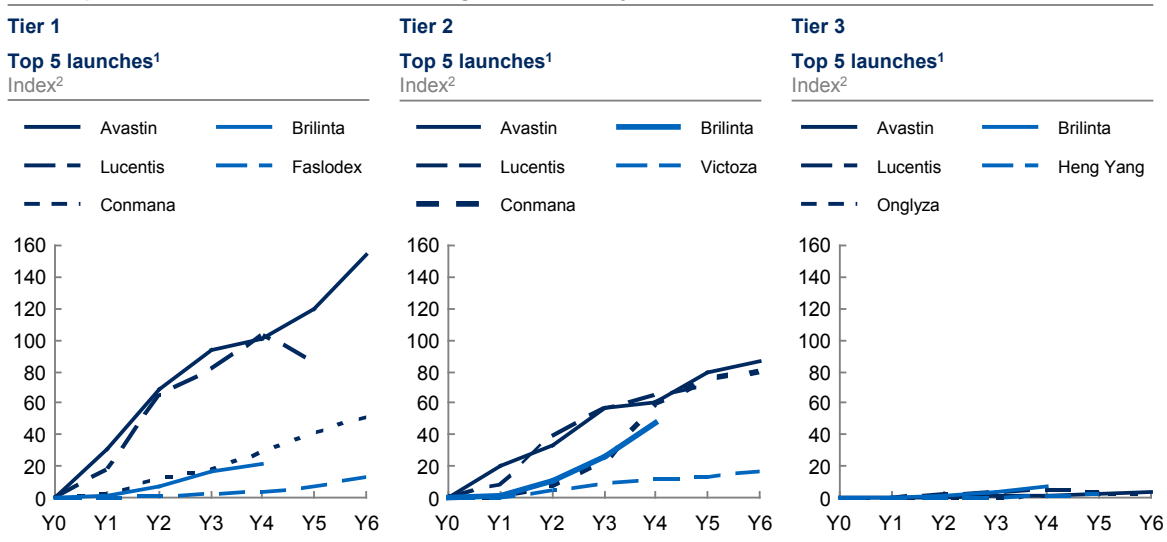


1 Based on data from 688 sample hospitals in 28 provinces
2 Assume baseline sales of Onglyza in Class 3 hospitals at year 1 is 1, the relative sales of other drugs are plotted
3 Assume baseline sales of Onglyza in Class 2 hospitals at year 1 is 1, the relative sales of other drugs are plotted

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Exhibit Appendix 2

Launch performance of selected innovative drugs in different city tiers

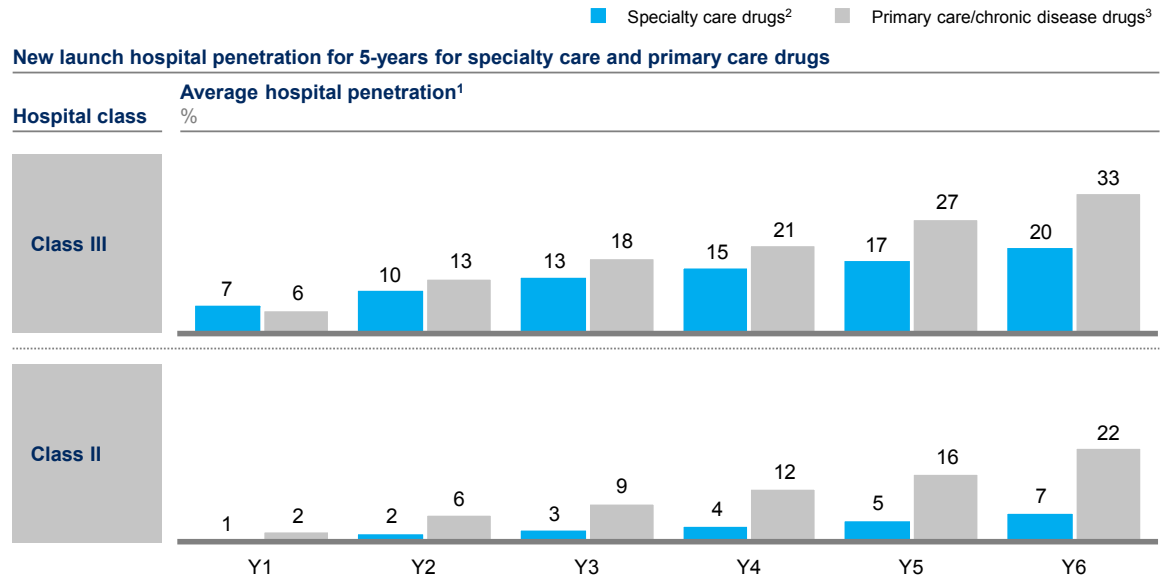


1 Based on data from 688 sample hospitals in 28 provinces
2 Assume baseline sales of Onglyza in Tier 3 cities at Year 1 is 1, the relative sales of other drugs are plotted

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Appendix 4: Additional analysis

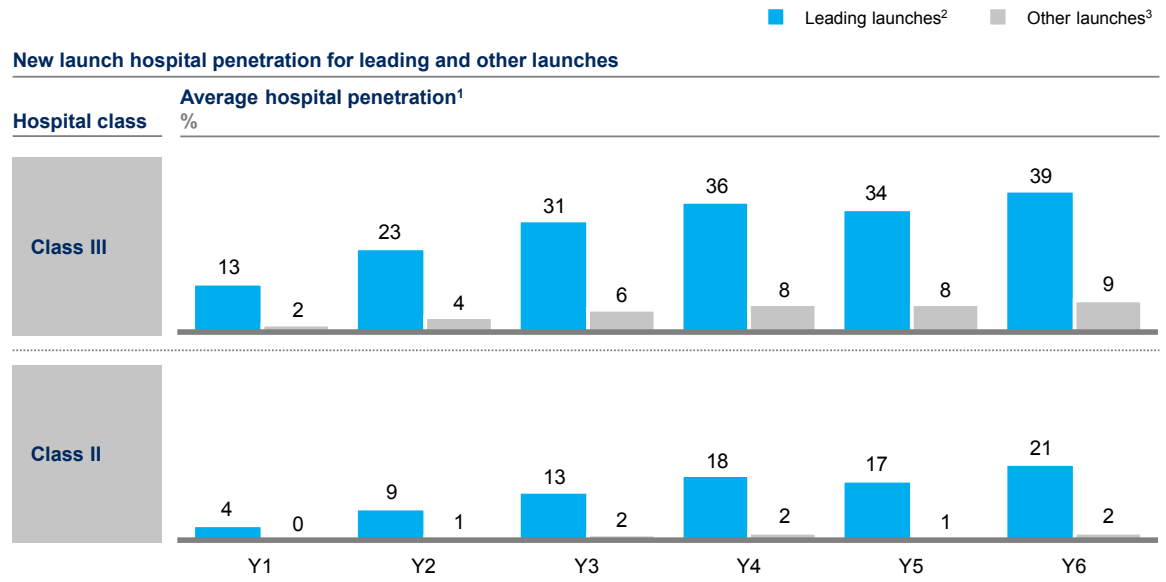
Exhibit Appendix 3



1 Based on data from 469 Class 3 hospitals in 28 provinces and 214 Class 2 hospitals in 26 provinces
2 Base on data from 9 specialty drugs
3 Based on data from 15 primary care/chronic disease drugs

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

Exhibit Appendix 4



1 Based on data from 469 Class 3 hospitals in 28 provinces and 214 Class 2 hospitals in 26 provinces
2 Base on data from top 20% performing drugs (5 drugs)
3 Based on data from remaining 80% of drugs (19 drugs)

SOURCE: Chinese Pharmaceutical Association; McKinsey analysis

About us

McKinsey & Company's Greater China Healthcare Practice

Since 2008, McKinsey's Healthcare Practice in Greater China has conducted over 300 client engagements for both multinationals and Chinese healthcare clients as well as government agencies, across all major sub-sectors of the industry, including pharmaceuticals, biologics, vaccines, medical products, consumer health/OTC, service providers, payers, and healthcare systems. We help clients on a range of topics concerning strategy, sales and marketing, market access, research and development, organization, corporate finance, and operations.

Our dedicated team comprises over 30 China-based partners, associate partners, consultants, and research analysts, all with significant healthcare experience that ranges from clinical practice to advanced degrees in biochemical engineering, neurobiology, and advanced degrees in the life sciences and public health related fields.

Beyond client engagements, we are involved in a broad range of collaborations with the government and with industry associations; we regularly convene expert roundtables; and we frequently deliver keynote speeches at major industry conferences.

The Science and Technology Development Center of the Chinese Pharmaceutical Association

The Science and Technology Development Center of the Chinese Pharmaceutical Association (DCSTCPA) was founded in 1990 as a provider of technological services and information, guided directly by the CPA. Since its inception, the Center has been working to benefit both the country and the industry. It is dedicated to promoting technological development, serving the industry, assisting government decision-making, and delivering social and economic benefits. The Center contributes to public health and economic development by playing an active role in uniting the pharmaceutical community and industry, promoting reciprocal interaction between pharmaceutical technology and the market economy, as well as supporting the sustainable development of pharmaceutical and healthcare technology.

Contact us

If you would like to discuss the report further or obtain a more detailed analysis of the latest industry trends and insights, please contact:

Author of CPA-McKinsey China Hospital Pharmaceuticals Report: An In-depth Perspective, at +86 (21) 6385 8888

You can also email us at: chinahealthcare@mckinsey.com

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