

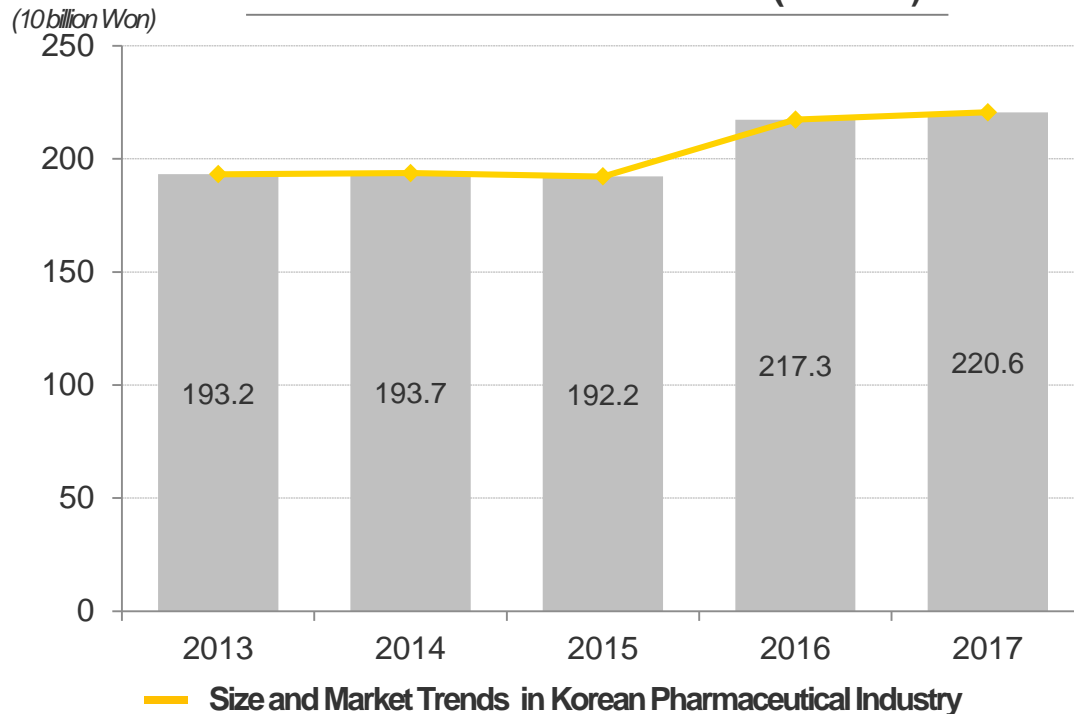
Pharmaceutical Industry

3.1. Pharmaceutical Industry

(1) Korean Pharmaceutical Market

- The size of Korea’s pharmaceutical market was at 2,206 billion won (approximately \$2.20 billion) in 2017.
- It continues to growth a steady path despite the global economic crisis.

Korean Pharma Market Size ('13~'17)



Source: Ministry of Food and Drug Safety - Food & Drug Statistical Yearbook (2018)

Market Size in 2017

Type	Volume (Unit. Bil Won)	'13~'17 CAGR (%)
Production	2,036	5.6
Export	460	18.5
Import	631	4.6
Market	2,206	3.4

- ▶ Total Market Size = Total Production – Total Export + Total Import
- ▶ The range of drugs include finished drugs ultrafiltration drugs, psychotropic, drug substances.
- ▶ FX rate : Applying for annual average won-dollar from Korean Bank

• Source: Ministry of Food and Drug Safety - Food & Drug Statistical Yearbook (2018)

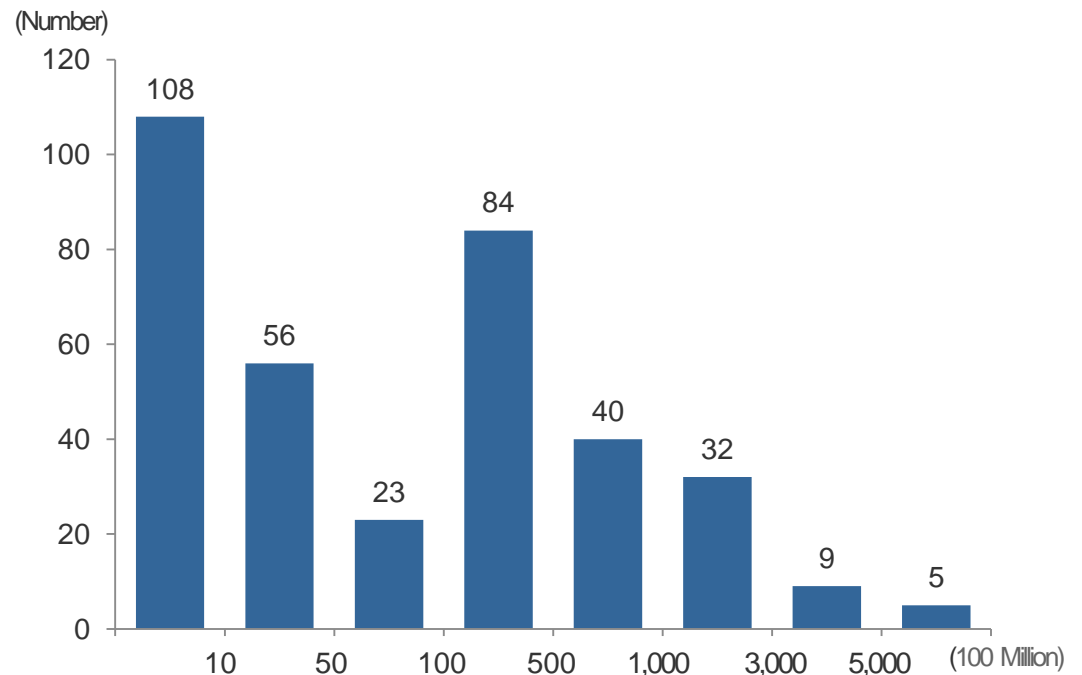
3.1. Pharmaceutical industry

(2) Production Volume of No. of manufacturers of finished medical supplies

- Production volume increased to 17,551.029 billion won in 2017.
- Korean Pharmaceutical industry is quickly entering into the advanced markets on the basis of the accumulated experiences in developing new drugs.

Production Volume and No. of Manufacturers of Finished Medical Products (by size) in 2017

Level (Over ~ less, Unit. 100 Million Won)	No. of Manufacturer	Volume (Million Won)
5,000~	5	3,306,125
3,000 ~ 5,000	9	3,330,883
1,000 ~ 3,000	32	5,383,556
500 ~ 1,000	40	2,948,271
100 ~ 500	84	2,250,816
50 ~ 100	23	171,069
10 ~ 50	56	140,509
~ 10	108	19,800
Total	357	17,551,029



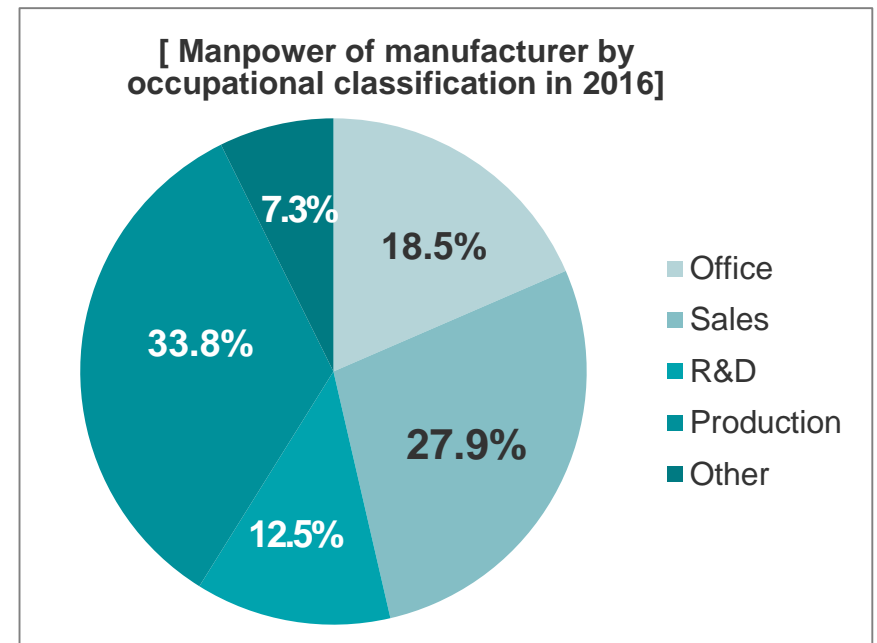
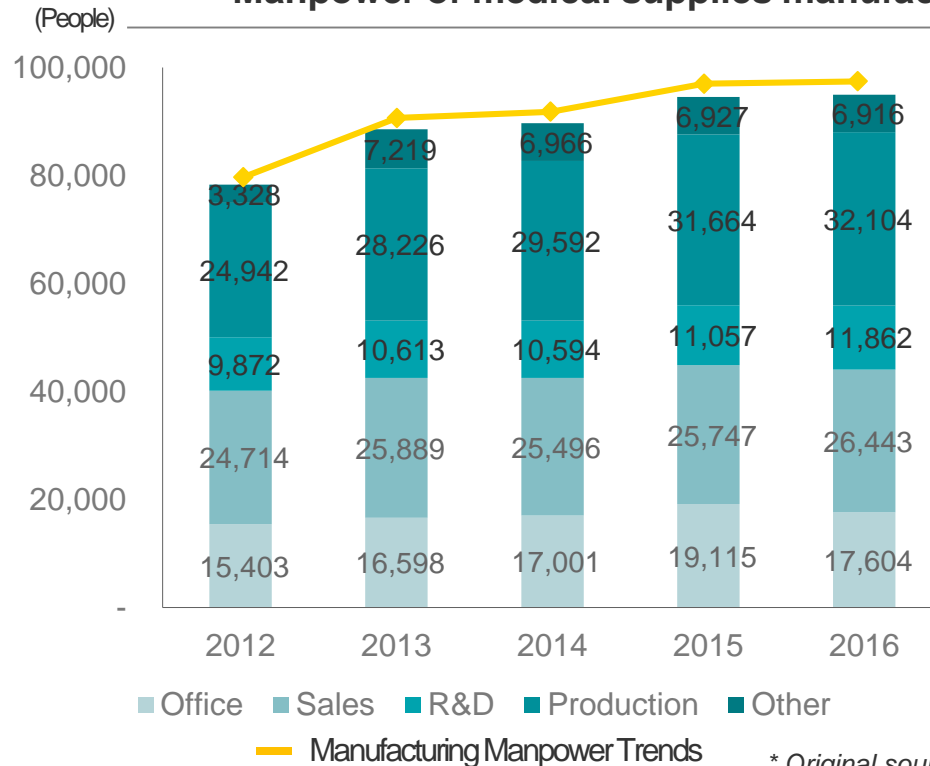
Source: Ministry of Food and Drug Safety - Food & Drug Statistical Yearbook (2018)

3.1. Pharmaceutical industry

(3) Manpower of manufacturer classified by occupation

- Manpower of manufacturer gradually increased up to 94,929 people in 2016.
- R&D manpower first surpassed to 10,000 people in 2013.
- Taking into account the importance of lowering labor cost in R&D, manpower in Korea has a price competitiveness.

Manpower of medical supplies manufacturer by occupational classification (2016)



* Source: 2017 KHIDI Pharmaceutical Industry Statics

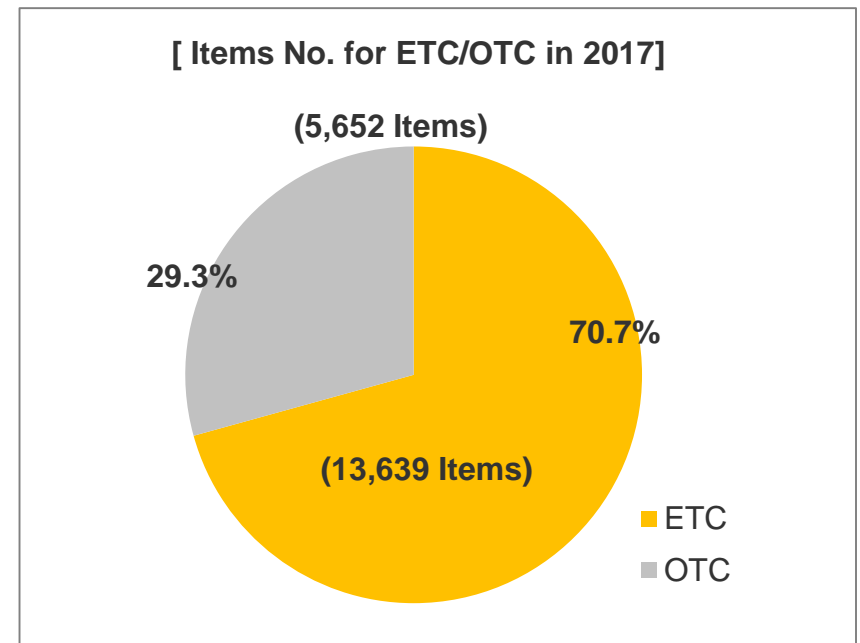
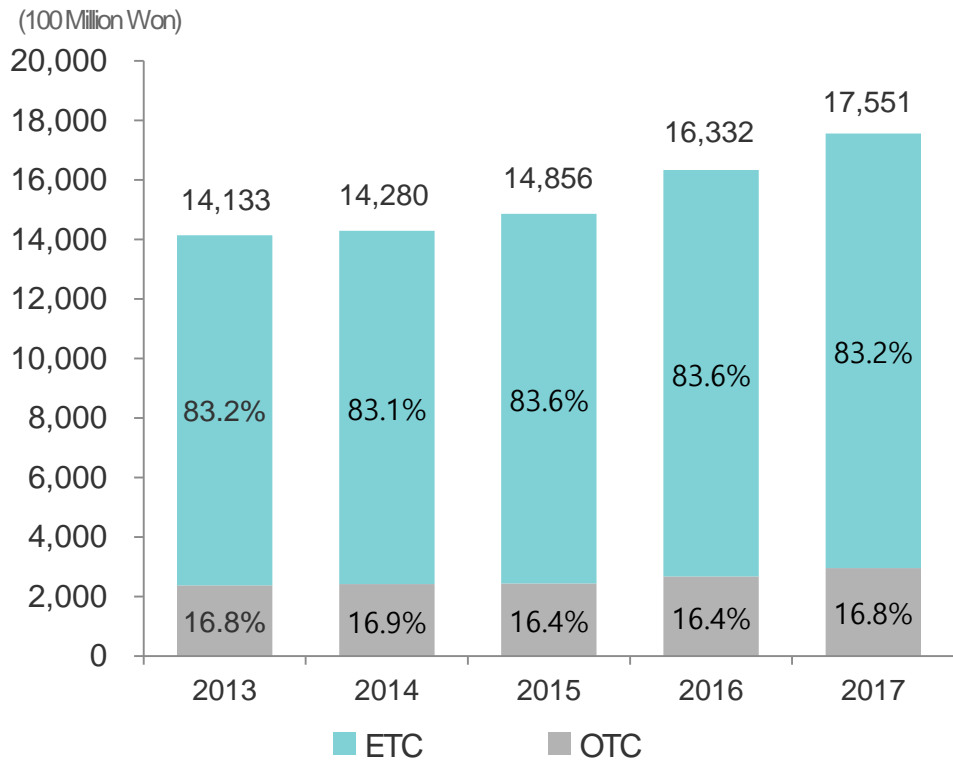
* Original source: Korea Pharmaceutical and Bio-Pharma Manufacturers Association(2017)

3.2. Medicine and Medical Supplies

(1) ETC-OTC Manufacturing Volume and Item Numbers

- Since 2009, the portion of ETC has been taking over 70% of pharmaceutical market.
- Due to the increasing ageing population and chronic disease, ETC has high potential to grow in Korean market.

ETC-OTC Manufacturing Volume and Item numbers('13~'17)



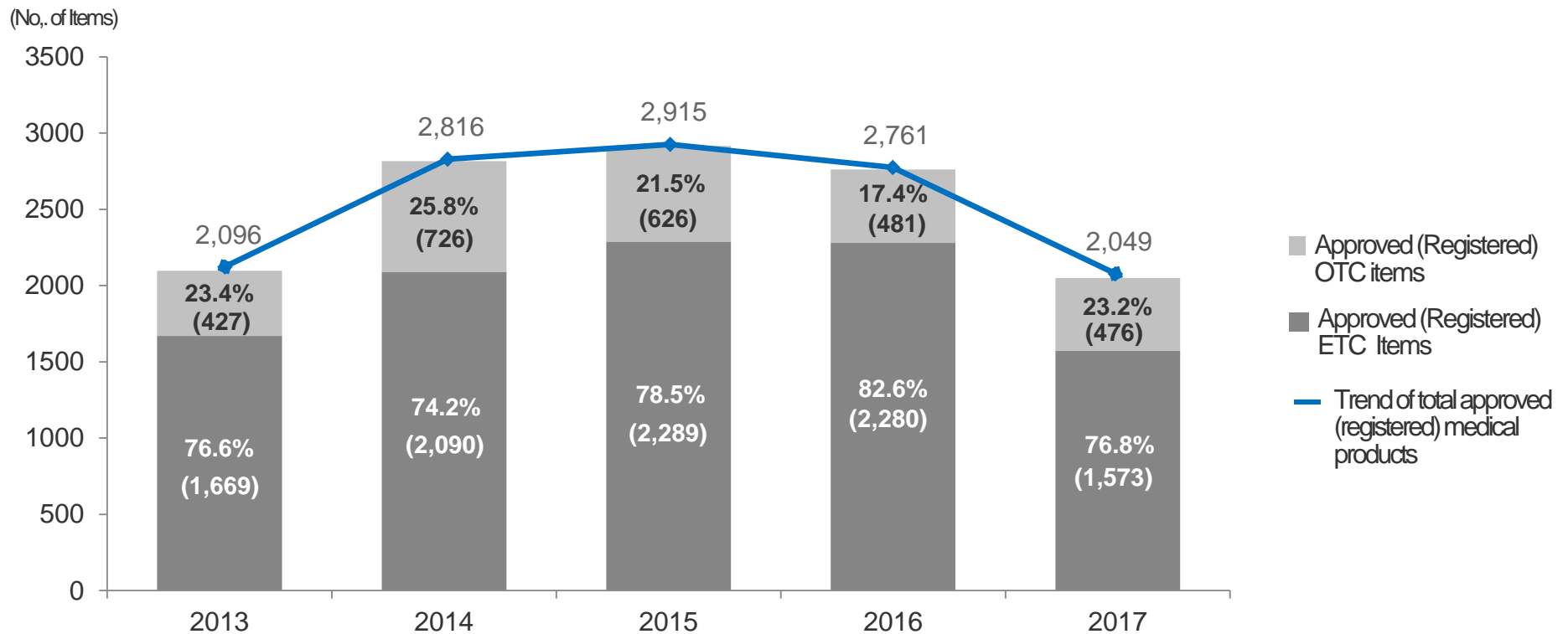
Source: Ministry of Food and Drug Safety –
Food & Drug Statistical Yearbook (2018)

3.2. Medicine and Medical Supplies

(2) Approval/Registration of ETC and OTC

- 1,573 item of ETC and 476 item of OTC have been approved by the Ministry of Food Drugs Safety(MFDS) in 2017.

Number of items for Approvals/Registrations of ETC and OTC ('13~'17)



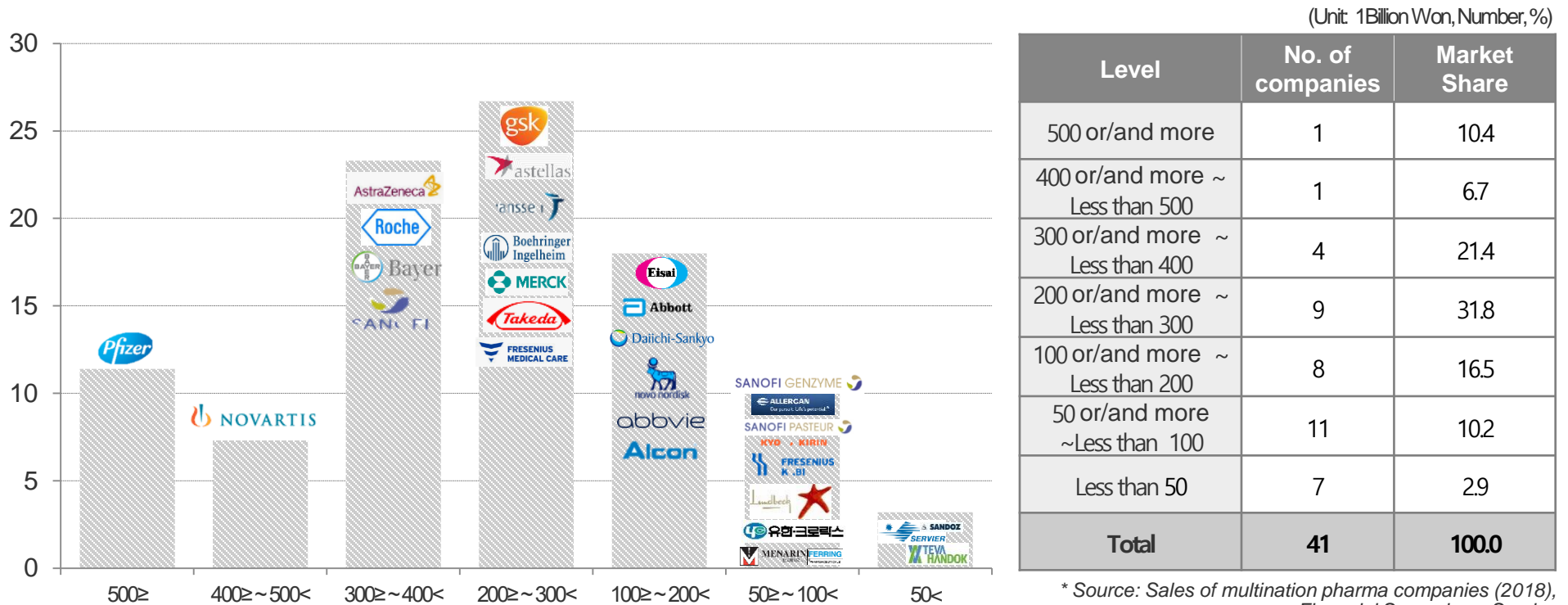
Source: 2017 Drug Approval Report (Ministry of Food and Drug Safety)

3.3. Pharmaceuticals companies

(1) Market Shares by sales in 2018 multinational pharmaceutical companies

Companies with sales over 200 billion won, such as Pfizer, Novartis, AstraZeneca, Roche, Bayer, Sanofi Korea, account for more than 70% of total sales in the Korean pharmaceutical market.

Market Shares by sales in 2018 multinational pharmaceutical companies



3.4. R&D for medicine

(1) R&D Expenditure

- Finished medicaments is the largest accounted for 88.4% (14,60 billion won), medicinal chemicals for 17.1%(283 billion won) and biosimilars for 13.1% (217 billion won) was in order.

R&D Trends for medicine (2016)

(Unit: 1 Million Won,%)

Type	R&D Expenditure (Total)		Large Companies		Middle Standing Enterprise		Medium-Small sized Enterprises	
	Amount	%	Amount	%	Amount	%	Amount	%
Finished Medicaments	1,459,965	88.4	124,638	83.7	1,158,670	91.3	176,657	75.6
Generic/ Biosimilar/ Vaccine	615,234	37.2	66,473	44.7	473,463	37.3	50,095	21.4
New Drug	590,030	35.7	40,690	27.3	471,810	37.2	23,830	10.2
Incrementally Modified Drug	254,702	15.4	17,476	11.7	213,397	16.8	102,733	43.9
Active Pharmaceutical Ingredient	192,310	11.6	24,202	16.3	110,994	8.7	57,114	24.4
Total	1,652,276	100.0	148,840	100.0	1,269,664	100.0	233,771	100.0

* Source: Pharmaceutical Industry Analysis in 2017(KHIDI)

3.4. R&D for medicine

(2) R&D Expenditure

- R&D expenditure compared to sales shows that large companies is the largest accounted for 9.8%, middle standing enterprise for 9.6% and medium-small sized enterprise for 4.7% was in order.

R&D Trends for medicine (2017)

(Unit: 1 Million Won,%)

Type	R&D Expenditure		Sales		R&D Expenditure/Sales
	Amount	%	Amount	%	%
Large Companies	148,840	9.0	1,511,400	7.7	9.8
Middle Standing Enterprise	1,269,664	76.8	13,180,388	67.1	9.6
Medium-Small sized Enterprises	233,771	14.1	4,950,345	25.2	4.7
Total	1,652,275	100.0	19,642,133	100.0	8.4

* Source: Pharmaceutical Industry Analysis in 2017(KHIDI)

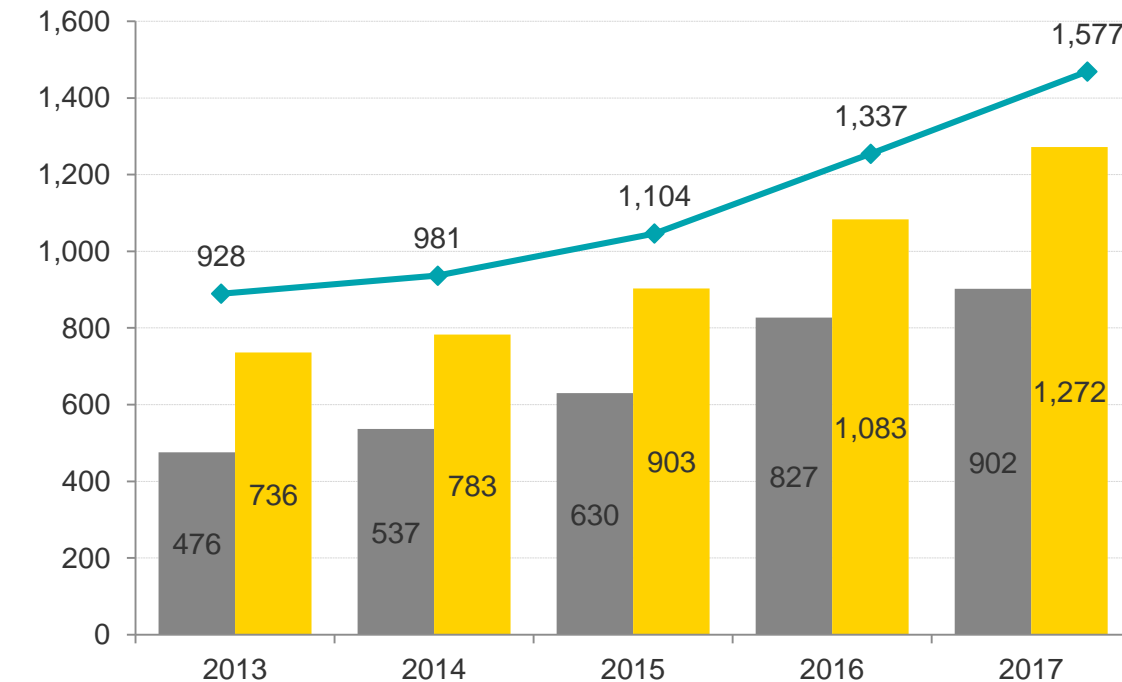
3.4. R&D for medicine and medical supplies

(3) Domestic Pharma Companies' R&D Expenditure

- R&D expenditure to sales by type of company shows 11.1%, 10.7% and 8.3% for the top 10 companies, innovative pharmaceutical enterprises and listed companies respectively.
- R&D expenditure of listed pharmaceutical companies was 1.6 trillion won in 2017. It is a 18.0% increase compared to the previous year.

Domestic Pharma Companies R&D Trend ('13~'17)

(Unit: 1 Billion Won)



■ Top 10 companies ■ Innovative pharmaceutical Enterprises¹ — Listed companies(n=119)

¹ 37 pharmaceutical enterprises certified by the Minister for Health and Welfare

[R&D to sales by size of company in 2017]

(Unit: %)

Type	Top 10 companies	Innovative Pharma	Listed Companies
2013	12.6	9.6	7.6
2014	10.6	8.6	7.0
2015	10.2	8.6	7.1
2016	12.1	9.5	7.8
2017	11.1	10.7	8.3

* Source: KHIDI(2017)