EvaluatePharma®

World Preview 2018, Outlook to 2024

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Welcome to the EvaluatePharma®
World Preview 2018, Outlook to 2024

The eleventh edition of EvaluatePharma's World Preview brings together many of our analyses to provide a top level insight, from the world's financial markets, into the expected performance of the industry between now and 2024. Based on EvaluatePharma's coverage of the world's leading 7,000 pharmaceutical and biotech companies, the World Preview highlights trends in prescription drug sales, patent risk, R&D spend, global brand sales and market performance by therapy area. Also included this year are analysis on Worldwide Pharma Innovation with insights into pipeline value creation through 2024, fastest growing companies and the top performers in terms of RoI.

Complimentary copies of the full report can be downloaded at:

www.evaluate.com/PharmaWorldPreview2018

Foreword

As we head into the second half of 2018 the pharma sector seems a more stable place. The political uncertainty that characterised much of 2017 may not have settled down, but is causing pharma and other industries less anxiety. Gone are the days when a presidential aside on pricing could cause the shares of pharma groups to lose millions if not billions.

And according to EvaluatePharma's World Preview 2018, we are looking at an industry set to experience sales accelerating from the sluggish levels following the financial crisis, to annual compound growth of over 6% between now and 2024.

Much of the expansion of the market will be driven by continuing unmet need in a number of disorders, as demonstrated by sales forecasts for the orphan drug market reaching $262bn in 2024, accounting for 20% of the total prescription drug market.

> The launch of novel therapies, including gene and cell therapies, as well as increased access to medicines globally should also help fuel progress in the market. Total prescription sales are expected to be $1.2trn in 2024.

However, it might not be all plain sailing for the industry, there is the ever-present danger of product failure as seen by the demise of Incyte's epacadostat, which has raised questions about the utility of combination immunotherapies.

And even if the threat of price control from politicians has evaporated it remains from payers. The demand for real world evidence before insurers and governments will consider reimbursing drugs will continue to intensify, no matter how innovative developers claim their products are, as Sanofi and Amgen have found with their cholesterol-lowering PCSK9 drugs.

As such, outcomes data is set to become an integral part of the industry.

What this will mean for the some of the most valuable R&D products in this year's report is hard to gauge. Those operating in niche or orphan areas like Vertex's triplet cystic fibrosis drug might find it easier to justify their pricing structure. Abbvie's new rheumatoid arthritis drug, upadacitinib, is however, more likely to face pushback on pricing given the increasing competition from biosimilar versions of Remicade.

Foreword

> The growing power of payers, combined with the arguably underestimated threat of biosimilars and the genericisation of some of the industry's biggest products, including Humira are factors that could act as a brake on growth. The report shows that $251bn of sales are at risk between 2018 and 2024, teeing up a second patent cliff the industry will have to get over.

These potential disruptions to the market could test industry growth forecasts and Evaluate is following the sector closely in order to help navigate this fast-moving landscape.

Faced with these challenges of keeping up innovation – at a reasonable cost – not to mention demonstrating value to increasingly wider audiences, including patients, pharma companies will have to take a long hard look at their business models in the coming years.

Earlier discussions with payers, targeted therapies and harnessing the advantages of technology such as machine learning for target screening will all play their part in changing business models and ensuring pharma does keep growing to meet forecasts.

Anees Malik
Managing Analyst, Evaluate Ltd

Lisa Urquhart
Editor, EP Vantage

Analysis Highlights

Worldwide Prescription Drug Sales 2018-24 in figures

+6.4% CAGR* 2018-24

Drivers		Brakes	
55	New FDA approvals in 2017, rebounding from 27 in 2016	Will payer pressure put a halt on drug budget growth?	+6.4% CAGR 2018-24
$124bn	Additional sales in 2024 from orphan drugs	Sales at risk between 2018 and 2024 due to patent expires	$251bn
+12%	2017-2024 CAGR for oncology	Average R&D spend per NME since 2007, suggesting more efficiency needed in R&D	$3.9bn
$5bn	Additional sales in 2024 from advanced therapies	R&D as a proportion of prescription sales in 2024, down from 20.9% in 2017 with a possible reduction in innovation	16.9%

* Compound Annual Growth Rate.

- Prescription drug sales expected to reach $1.2trn in 2024, due to novel therapies addressing key unmet needs, as well as increasing access to medicines globally. Payer scrutiny and sales losses from genericization and biosimilars will act as brakes on growth

- Novartis will be the leading prescription drug company in 2024 with sales of $53.2bn, ahead of Pfizer and Roche, both of whom are closely competing for the second spot

Analysis Highlights

- Should Takeda complete its intended acquisition of Shire and forecast projections for a combined portfolio hold, the combined entity would be the 9th largest pharmaceutical company based on 2024 sales

- Vertex's triple combination, VX-659 + tezacaftor + ivacaftor, is anticipated to be the most valuable project in the pharmaceutical industry pipeline with $13,070m NPV

- R&D spend is forecast to grow at a CAGR of 3.1% to 2024 lower than the CAGR of 3.6% between 2010 and 2017, signalling expectations that companies will be improving R&D efficiencies or less revenue will be directed towards replenishing pipelines

- For the top 20 pharma companies, organic value creation focused on core therapeutic areas is forecast to deliver greatest value gain over 2018 and 2024 with cumulative sales of $324bn

- Humira remains the top selling drug in 2024, despite a CAGR of -3% over the next 7 years, due to adalimumab biosimilar entry in the USA being delayed to 2023

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Worldwide Prescription Drug Sales (2010-2024)

Prescription drug sales CAGR for 2018 through 2024 six times that in 2011 through 2017; Orphan drug market to almost double.

While prescription drug sales for 2011 through 2017 grew at a CAGR of only +1.2%, an annual CAGR of +6.4% is forecast for 2018 through 2024, with prescription drug sales expected to reach $1.2trn. Growth will be driven by the continued uptake and anticipated launch of novel therapies addressing key unmet needs, as well as increasing access to medicines globally. Payer scrutiny and sales losses from genericization and biosimilar competition will act as brakes on growth.

The orphan drugs sector is expected to outperform the market, almost doubling in size over 2018-2024 and peaking at $262bn in 2024, accounting for approximately 20% of prescription sales. This highlights the industry's continued move to address small groups of neglected patients with high unmet need and to benefit from traditionally reduced payer scrutiny on orphan drugs, as well as regulatory and financial incentives.

Gene and cell therapies will also increasingly contribute to growth, building on the approval and launch of CAR-T therapies in 2017 and the launch of Luxturna (Spark Therapeutics), the first FDA approved gene therapy for vision loss, in 2018.
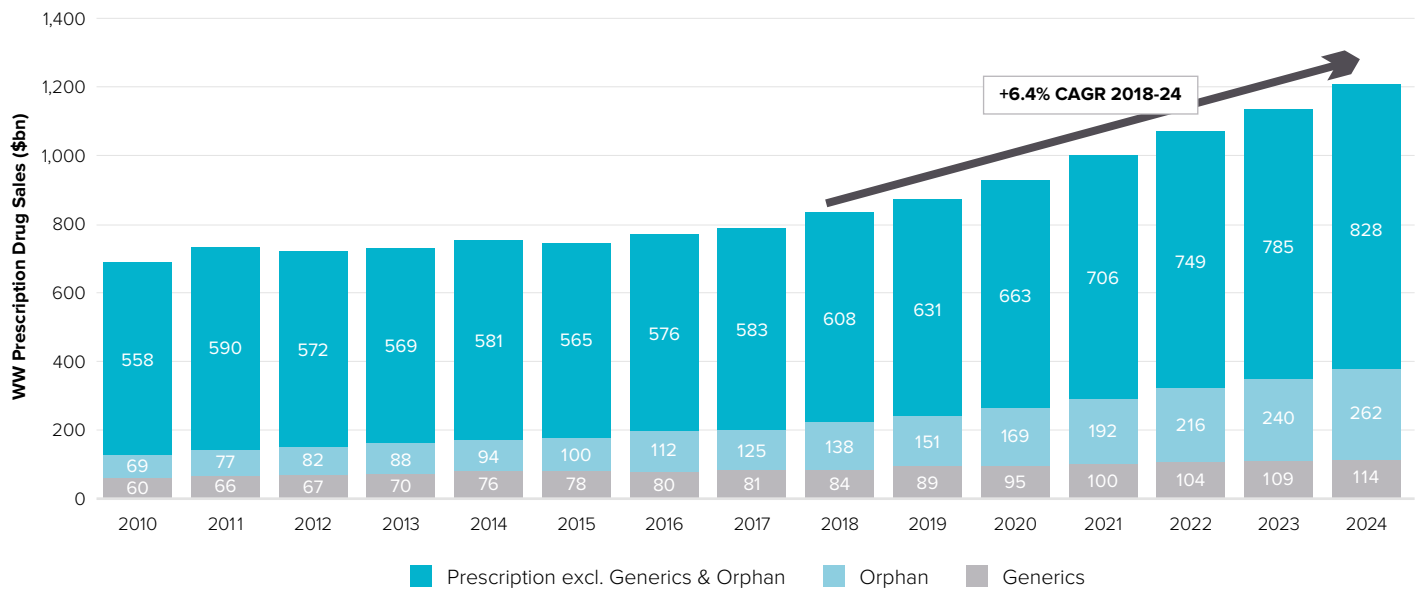
However, recent industry set-backs in the immuno-oncology space with Incyte's Epacadosat failing to make a case for combination immunotherapy highlights the inherent risk of developing novel therapies and are indicative of why diversity across the industry is healthy.

Drug affordability and accessibility continue to apply downward pressure on the market with payers, including those in the USA, acting to limit prescribing options to drugs which provide sufficient real-world value. A continued trend will be the industry's response to this pressure in ensuring the development of value-based pricing and reimbursement approaches that de-risk healthcare budgets and clinical programmes that reflect the demands of payers (e.g. outcomes data).

There are also $251bn of sales at risk between 2018 and 2024, with more than 25% of these in 2023, when key patents of several biologics including Humira and Stelara will expire. However, both are still forecast to retain spots among the World's top 10 selling drugs in 2024.

Worldwide Total Prescription Drug Sales (2010-2024)

Source: Evaluate, May 2018

+6.4% CAGR 2018-24

Year	Prescription excl. Generics & Orphan	Orphan	Generics
2010	558	69	60
2011	590	77	66
2012	572	82	67
2013	569	88	70
2014	581	94	76
2015	565	100	78
2016	576	112	80
2017	583	125	81
2018	608	138	84
2019	631	151	89
2020	663	169	95
2021	706	192	100
2022	749	216	104
2023	785	240	109
2024	828	262	114

WW Prescription Drug Sales ($bn)

Legend: Prescription excl. Generics & Orphan · Orphan · Generics
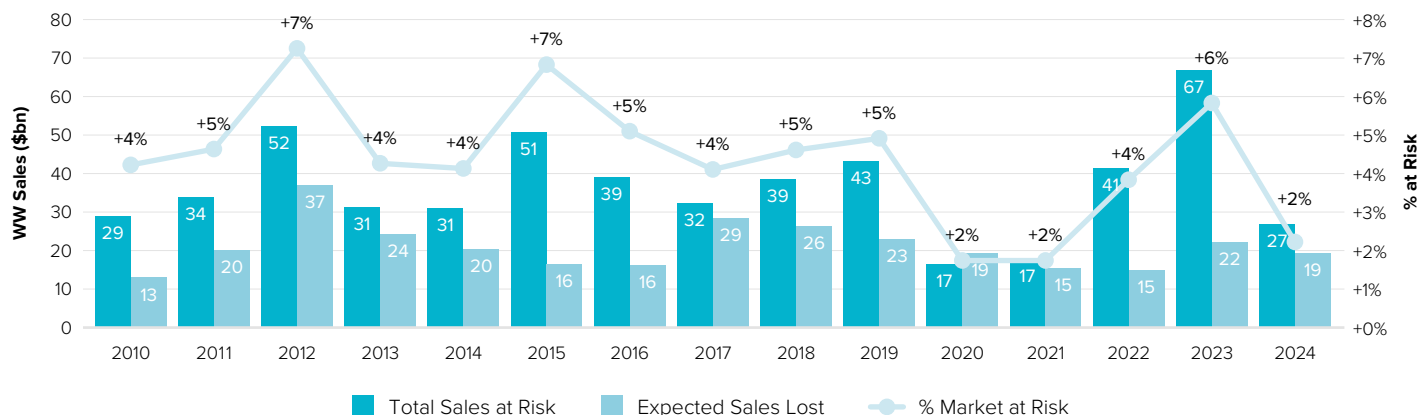
Worldwide Sales At Risk from Patent Expiration (2010-2024)

Source: Evaluate, May 2018

Patent Analysis: 'Total Sales at Risk' represents the worldwide product sales in the year prior to patent expiry but allocated to the year of expiry. E.g. Plavix had sales of $7.1bn in 2011, this is shown above as 'At Risk' in 2012.

Worldwide Prescription Drug Sales (2010-2014)

Source: Evaluate, May 2018

Year	WW Prescription Sales ($bn)														
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Prescription	687	733	720	727	751	743	769	789	830	872	926	997	1,070	1,134	1,204
Growth per Year		+6.7%	-1.7%	+1.0%	+3.3%	-1.1%	+3.4%	+2.6%	+5.3%	+5.0%	+6.3%	+7.7%	+7.2%	+6.0%	+6.2%
Change vs. June 2017 ($bn)								14	20	12	6	7	10	-	-
Generics	60	66	67	70	76	78	80	81	84	89	95	100	104	109	114
Generics as % of Prescription	8.7%	9.0%	9.3%	9.6%	10.1%	10.5%	10.4%	10.2%	10.2%	10.3%	10.2%	10.0%	9.8%	9.6%	9.4%
Prescription excl. Generics	627	667	653	657	675	666	688	708	746	782	832	898	965	1,025	1,090
Growth per Year		+6.3%	-2.0%	+0.6%	+2.8%	-1.5%	+3.4%	+2.9%	+5.3%	+4.9%	+6.3%	+8.0%	+7.5%	+6.2%	+6.4%
Orphan	69	77	82	88	94	100	112	125	138	151	169	192	216	240	262
Prescription excl. Generics & Orphan	558	590	572	569	581	565	576	583	608	631	663	706	749	785	828

Prescription incl. Generics CAGR 2018-24 +6.4%

Note: Sales to 2017 based on company reported sales data. Sales forecasts to 2024 based on a consensus of leading equity analysts' estimates for company product sales and segmental sales.

Worldwide Sales At Risk from Patent Expiration (2010-2024)

Source: Evaluate, May 2018

Year	WW Prescription Sales ($bn)														
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total Sales at Risk	29	34	52	31	31	51	39	32	39	43	17	17	41	67	27
Expected Sales Lost	13	20	37	24	20	16	16	29	26	23	19	15	15	22	19
% Market at risk	+4%	+5%	+7%	+4%	+4%	+7%	+5%	+4%	+5%	+5%	+2%	+2%	+4%	+6%	+2%

Worldwide Prescription Drug Sales in 2024: Top 20 Companies

Novartis is forecast to record the highest worldwide sales of prescription drugs in 2024.

EvaluatePharma® anticipates Novartis will be the leading prescription drug company in 2024 with sales of $53.2bn, ahead of Pfizer and Roche, both of whom are closely competing for the second spot.

Novartis' lead position highlights the strength of the company's diverse portfolio of innovative medicines which span multiple therapeutic areas, biosimilars and generics. While only three Novartis products are forecast to be among the world's top 50 selling drugs in 2024 (Cosentyx [19], Entresto [26], Jakafi [31]), the company is forecast to have ten products with sales over $1bn, and a further twelve products with sales over $0.5bn by 2024. Additionally, Novartis continues to make strategic investments to remain at the forefront of emerging technologies. Kymriah was the first FDA approved CAR-T therapy and the company has also acquired AveXis, a leading gene therapy company, for $8.7bn.

Pfizer secures the number 2 spot based on forecast expectations for key innovative brands in oncology (Ibrance, Bavencio) and immunology (Xeljanz, Eucrisa), biosimilars, and the stable contribution of off-patent brands within the company's essential health portfolio. Roche closes out the top three on the heels of Pfizer. Oncology still dominates the Swiss company's portfolio, with Tecentriq its leading single growth driver, but the company is increasingly relying on non-oncology assets to drive growth with products like Ocrevus and Hemlibra.

Behind the top three, J&J has a faster CAGR than any of its top 3 rivals with better than expected performance from its lead drug, Stelara. However, amongst the top 20, Celgene has the highest CAGR, the company is expected to go from 21st in 2017 to 13th in 2024 based on revenue expansion in oncology and immunology. Notably, should Takeda complete its intended acquisition of Shire, the combined entity would enter the top 10 if broker forecast projections for a combined portfolio hold.

Worldwide Prescription Drug Sales in 2024: Top 10 Companies

Source: Evaluate, May 2018
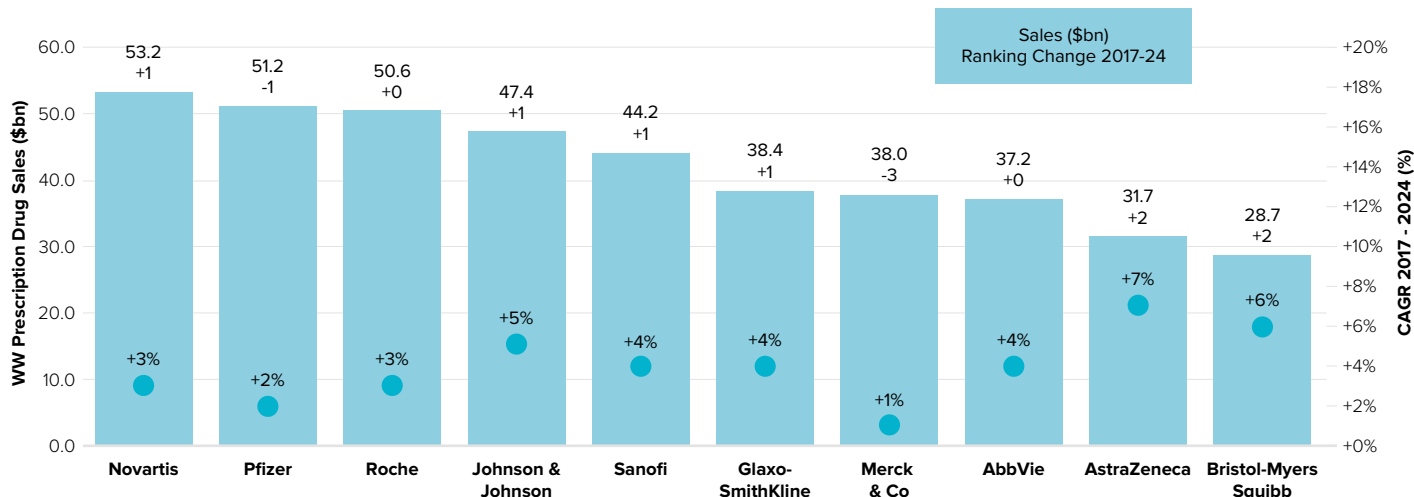
Worldwide Prescription Drug Sales (2017-2024): Top 20 Companies & Total Market

Source: Evaluate, May 2018

Rank	Company	WW Prescription Sales ($bn)			WW Market Share			Rank
		2017	2024	CAGR	2017	2024	Chg. (+/-)	Chg. (+/-)
1.	**Novartis**	**41.9**	**53.2**	+3%	5.3%	4.4%	-0.9pp	+1
2.	**Pfizer**	**45.4**	**51.2**	+2%	5.8%	4.3%	-1.5pp	-1
3.	**Roche**	**41.7**	**50.6**	+3%	5.3%	4.2%	-1.1pp	+0
4.	**Johnson & Johnson**	**34.4**	**47.4**	+5%	4.4%	3.9%	-0.4pp	+1
5.	**Sanofi**	**34.1**	**44.2**	+4%	4.3%	3.7%	-0.6pp	+1
6.	**GlaxoSmithKline**	**28.7**	**38.4**	+4%	3.6%	3.2%	-0.4pp	+1

Worldwide Prescription Drug Sales in 2024: Top 20 Companies

Source: Evaluate, May 2018

| Rank | Company | WW Prescription Sales ($bn) | | | WW Market Share | | | Rank |
		2017	2024	CAGR	2017	2024	Chg. (+/-)	Chg. (+/-)
7.	Merck & Co	35.4	38.0	+1%	4.5%	3.2%	-1.3pp	-3
8.	AbbVie	27.7	37.2	+4%	3.5%	3.1%	-0.4pp	+0
9.	AstraZeneca	19.8	31.7	+7%	2.5%	2.6%	+0.1pp	+2
10.	Bristol-Myers Squibb	19.3	28.7	+6%	2.4%	2.4%	-0.1pp	+2
11.	Amgen	21.8	24.8	+2%	2.8%	2.1%	-0.7pp	-1
12.	Novo Nordisk	17.0	24.6	+5%	2.2%	2.0%	-0.1pp	+4
13.	Celgene	12.9	23.7	+9%	1.6%	2.0%	+0.3pp	+8
14.	Eli Lilly	18.5	22.2	+3%	2.3%	1.8%	-0.5pp	-1
15.	Bayer	17.7	19.7	+2%	2.2%	1.6%	-0.6pp	+0
16.	Gilead Sciences	25.7	19.0	-4%	3.3%	1.6%	-1.7pp	-7
17.	Boehringer Ingelheim	14.3	18.3	+4%	1.8%	1.5%	-0.3pp	+2
18.	Shire	14.4	17.7	+3%	1.8%	1.5%	-0.4pp	+0
19.	Takeda	13.3	17.0	+4%	1.7%	1.4%	-0.3pp	+1
20.	Allergan	14.9	16.8	+2%	1.9%	1.4%	-0.5pp	-3
	Total Top 20	498.8	624.7	+3%	63.2%	51.9%	-11.3pp	
	Other	290.0	578.8	+10%	36.8%	48.1%		
	Total	788.8	1,203.5	+6%	100.0%	100.0%		

Note: Prescription drug sales include generic drug sales. Excludes alliance revenue and royalties where possible.

Worldwide Prescription Drug & OTC Sales by Technology (2010-2024)

Biotechnology products increasingly contribute to sales, representing 52% of the top 100 product sales by 2024; Roche is undoubtedly the biggest player within the Biotech market.

EvaluatePharma® finds biotechnology products will represent 31% of market in 2024 from 25% in 2017. Similarly, within the world's top 100 products, biotechnology products will represent 52% of sales in 2024 from 49% in 2017. This change is indicative of the reliance the industry has on novel drug targets only accessible through biotechnology products.
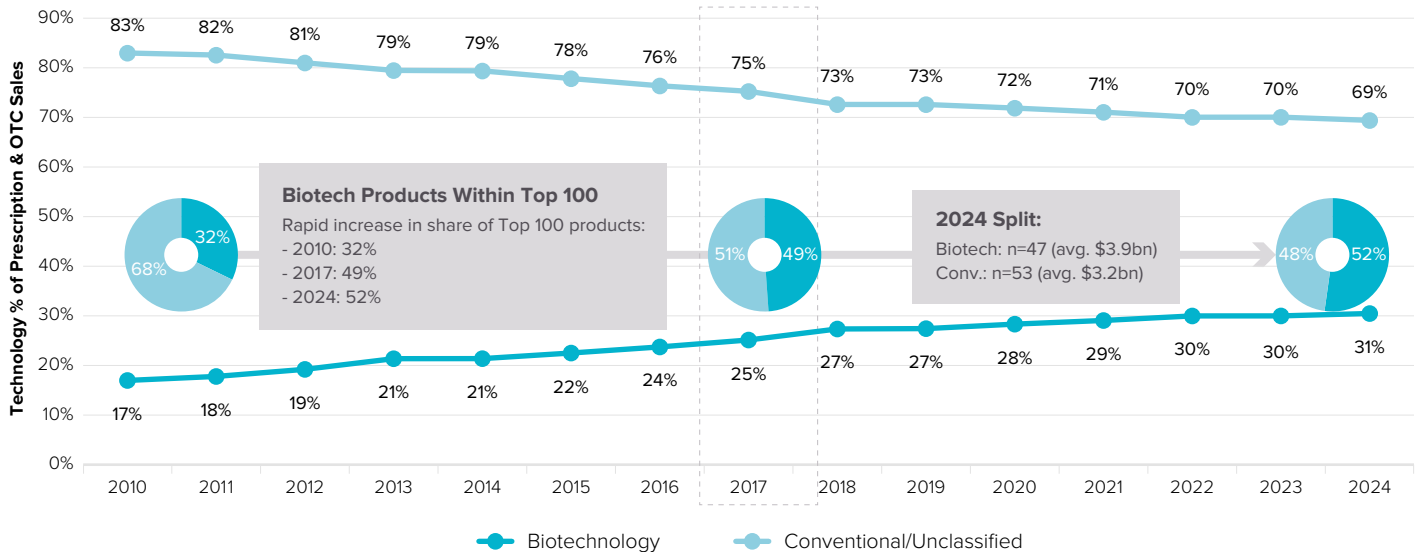
Roche will continue to be the undisputed market leader for biotechnology products in 2024, highlighting again the long-term value Roche gained through its acquisition of Genentech, a biotechnology pioneer, and continued investments in biotechnology products. Merck & Co is forecast to jump to third place with the highest CAGR for its biotechnology sales (11%) primarily due to

magnitude of expectations for its PD-L1 inhibitor, Keytruda. Sanofi and Bristol-Myers Squibb have the second and third highest CAGR (10% and 9% respectively), and both move up 3 positions from 2017 to 2024. For Sanofi, growth is reflective of the increasing importance of key brands resulting from its partnership with Regeneron (Dupixent, Praluent, Kevzara). For Bristol-Myers Squibb, like Merck, growth is reflective of revenue from the company's PD-L1 inhibitor, Opdivo.

AbbVie uniquely is set to have a negative CAGR as biosimilar competition for Humira sets in. While the company has multiple key assets to counteract this revenue loss only one key asset, Risankizumab, is a biotechnology product. The company's other key biotechnology pipeline asset Rova-T was substantially downgraded this year.

Worldwide Prescription Drug & OTC Pharmaceutical Sales: Biotech vs. Conventional Technology

Source: Evaluate, May 2018

Biotech Products Within Top 100
Rapid increase in share of Top 100 products:
- 2010: 32%
- 2017: 49%
- 2024: 52%

2024 Split:
Biotech: n=47 (avg. $3.9bn)
Conv.: n=53 (avg. $3.2bn)

Worldwide Prescription Drug & OTC Sales by Technology (2010-2024)

Source: Evaluate, May 2018

Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Biotechnology	17%	18%	19%	21%	21%	22%	24%	25%	27%	27%	28%	29%	30%	30%	31%
Conventional/Unclassified	83%	82%	81%	79%	79%	78%	76%	75%	73%	73%	72%	71%	70%	70%	69%
Total Prescription & OTC Sales	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

	WW Sales ($bn)														
Technology	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Biotechnology	124	135	145	157	170	174	192	208	230	250	273	302	332	357	383
Conventional	444	467	446	438	449	444	447	447	459	474	497	531	564	592	626
Other Unclassified Sales	152	167	165	170	171	160	166	170	179	187	196	206	217	229	241
Total Prescription & OTC Sales	**720**	**769**	**757**	**766**	**790**	**777**	**804**	**825**	**868**	**911**	**967**	**1039**	**1113**	**1178**	**1249**

Worldwide Prescription Drug Sales from Biotechnology in 2024:
Top 10 Companies

Source: Evaluate, May 2018

Rank	Company	WW Sales ($bn)			WW Market Share			
		2017	2024	% CAGR 17-24	2017	2024	Chg. (+/-)	Rank Chg.
1.	**Roche**	34.4	**42.1**	+3%	16.5%	11.0%	-5.5pp	+0
2.	**Sanofi**	13.6	**26.2**	+10%	6.5%	6.8%	+0.3pp	+3
3.	**Merck & Co**	11.0	**22.9**	+11%	5.3%	6.0%	+0.7pp	+5
4.	**Amgen**	19.1	**22.0**	+2%	9.2%	5.7%	-3.4pp	-1
5.	**Johnson & Johnson**	14.0	**20.5**	+6%	6.7%	5.3%	-1.4pp	-1
6.	**AbbVie**	19.3	**17.7**	-1%	9.3%	4.6%	-4.6pp	-4
7.	**Bristol-Myers Squibb**	9.0	**16.1**	+9%	4.3%	4.2%	-0.1pp	+3
8.	**Eli Lilly**	9.1	**15.3**	+8%	4.4%	4.0%	-0.4pp	+1
9.	**Novo Nordisk**	12.6	**15.2**	+3%	6.1%	4.0%	-2.1pp	-3
10.	**Pfizer**	11.0	**14.6**	+4%	5.3%	3.8%	-1.5pp	-3

Note: Company drug sales from undisclosed products are presumed to be from conventional (small molecule) technology.

Worldwide Pharma Innovation: Value Creators

Gilead's recently launched and pipeline portfolio is forecast to generate greatest value.

EvaluatePharma® finds that Gilead's recently launched and pipeline portfolio is expected to generate $111.5bn in sales between 2018-2024, due to forecast uptake of the company's HIV portfolio. Roche's portfolio is ranked second highest with forecast sales of $94.9bn surprisingly due in large part to non-oncology therapies and Novartis follows closely behind based on expectations of continued adoption of its chronic therapy products, Cosentyx and Entresto.

Similarly, across the rest of the top 10 companies, a diverse range of lead assets are represented as future company headliners. These products encompass multiple therapy areas, chronic and short time treatments, and varying addressable population sizes. This suggests that despite oncology being the dominant therapy area in 2024 the broad move across companies to invest in oncology has led to increased competition. This has reduced sales expectations for single oncology assets with forecast expectations reflecting a more fragmented market as products carve out market share.

Novartis narrowly leads AbbVie in terms of pipeline value creation, with forecast cumulative sales of $22.9bn vs. $21.2bn. Novartis has already indicated the potential best-in-class performance its key products, brolucizumab (in development for diabetic macular oedema and neovascular age-related macular degeneration) and Siponimod (in development for secondary progressive multiple sclerosis).

Only a single biosimilar, Amgen's Amjevita (biosimilar adalimumab) appears as a lead pipeline product. However, Amgen's biosimilar portfolio in total is highly impactful on pipeline value creation with consensus forecasts for biosimilars representing 60% of pipeline value. This suggests that Amgen's strategy of repurposing their biotechnology expertise to develop biosimilars is expected to be a success but also that the market expects limited revenue resulting from innovation. Similarly, Pfizer's biosimilar portfolio represents 39% of total pipeline value which will accrue to the established products business.

Value creation from recently launched[1] and pipeline products ($bn)

Ranking	Change in ranking vs. 2017	Company	Cumulative Sales 2018-24	Lead product/s
1.	-	**Gilead Sciences**	111.5	Biktarvy, Genvoya, Descovy
2.	▲ 5	**Roche**	94.9	Ocrevus, Tecentriq, Hemlibra
3.	▲ 1	**Novartis**	94.8	Cosentyx, Entresto
4.	▲ New	**Johnson & Johnson**	74.5	Darzalex, Tremfya
5.	-	**Pfizer**	71.9	Ibrance, Eucrisa
6.	▲ 4	**AstraZeneca**	62.7	Tagrisso, Imfinzi
7.	▲ 1	**Sanofi**	62.2	Dupixent, Toujeo, Praluent
8.	▲ New	**AbbVie**	48.6	Mavyret, Venclexta
9.	▼ 3	**Eli Lilly**	46.4	Taltz, Verzenio, Basaglar
10.	▼ 7	**GlaxoSmithKline**	40.3	Shingrix, Nucala

Value creation from pipeline products ($bn)

Ranking	Change in ranking vs. 2017	Company	Cumulative Sales 2018-24	Lead product/s
1.	▲ 5	**Novartis**	22.9	Brolucizumab, Siponimod
2.	▲ 1	**AbbVie**	21.2	Upadacitinib, Elagolix, Risankizumab
3.	▲ 6	**Celgene**	15.4	Ozanimod, Luspatercept
4.	▼ 2	**AstraZeneca**	14.8	Roxadustat, ZS-9
5.	▲ New	**Amgen**	13.7	Aimovig, Amjevita
6.	▲ 1	**Pfizer**	13.1	Talazoparib, Tanezumab
7.	▲ 1	**GlaxoSmithKline**	10.6	GSK2857916, Dolutegravir & Lamivudine
8.	▲ New	**Merck & Co**	9.6	Lusduna, V114
9.	▲ New	**Shire**	9.4	Lanadelumab
10.	▼ 9	**Roche**	9.3	Etrolizumab, Polatuzumab Vedotin

[1] Products launched from 2015 onward.

Worldwide Pharma Innovation: Value Creation Strategy

Organic value creation focused on core therapeutic areas forecast to deliver greatest value, Gilead most dependent on value creation strategy, Novartis expected to lead in advanced therapies.

Considering the top 20 companies' recently launched and pipeline portfolios, value creation for products in existing core therapeutic areas is forecast to deliver the greatest value gain over 2018 and 2024 with cumulative sales of $579bn. Products in non-core are forecast to have cumulative sales of $334bn. The dominance of sales from core areas is also reflected in the balance of individual companies' portfolios, however there some exceptions. Sanofi, Novartis and Amgen are all weighted more towards sales from non-core, highlighting forecast expectations for portfolio diversification away from core areas for these companies. Value creation from organic and inorganic activity is relativity comparable ($441bn vs. $472bn) across the top 20 companies.

From the top 20 companies, Gilead is most dependent on value creation from recently launched and pipeline products, due to revenue expectations for the company overall being increasingly driven by the company's switch to reliance on its HIV franchise.

Development and commercialisation of advanced therapies (cell and gene therapies) is increasingly being used as an engine of value creation within the industry. Should broker estimates for AveXis hold or improve following the acquisition of AveXis by Novartis, Novartis would be the leading company in advanced therapies, with the company possessing AVXS-101 and Kymriah, and having non-USA marketing rights to Luxturna.

Pharma Top 20 Recently Launched and Pipeline Value Creation Strategy

Source: Evaluate, May 2018
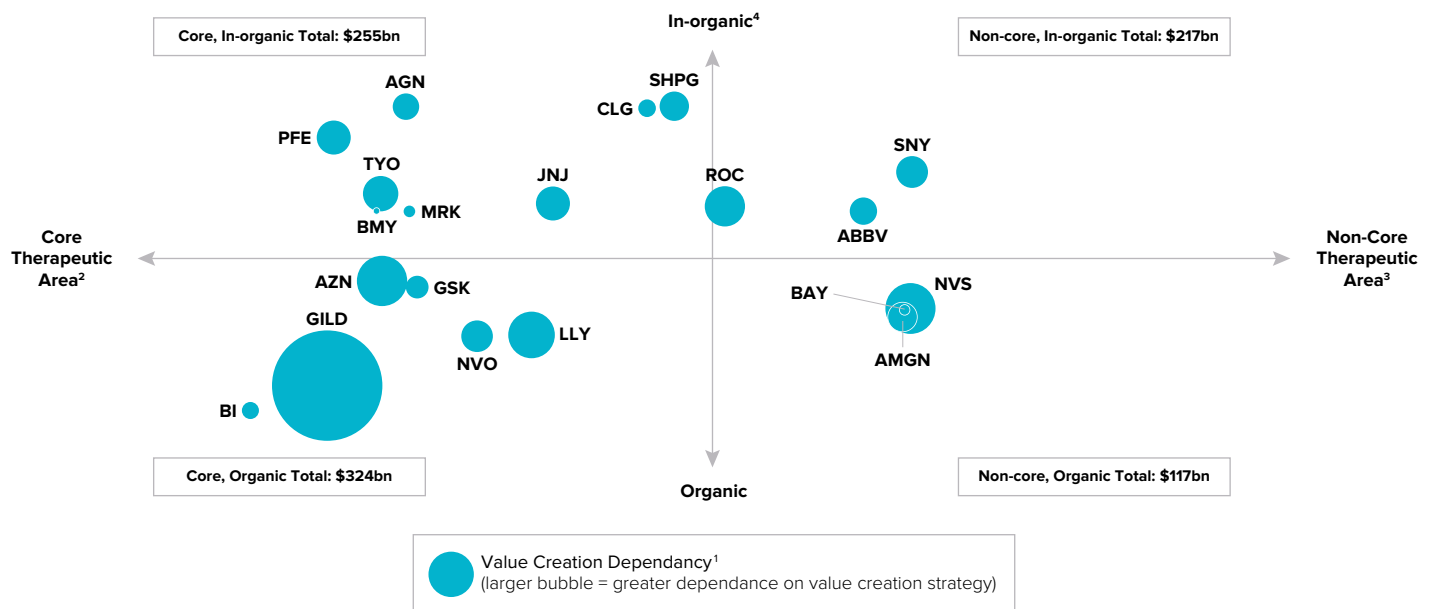
ABBV = AbbVie, **AGN** = Allergan, **AMGN** = Amgen, **AZN** = AstraZeneca, **BAY** = Bayer, **BI** = Boehringer Ingleheim, **BMY** = Bristol-Myers Squibb, **CLG** = Celgene, **LLY** = Eli Lilly, **GILD** = Gilead Sciences, **GSK** = GlaxoSmithKline, **JNJ** = Johnson & Johnson, **MRK** = Merck & Co, **NVS** = Novartis, **NVO** = Novo Nordisk, **PFE** = Pfizer, **ROC** = Roche, **SNY** = Sanofi, **SHPG** = Shire, **TYO** = Takeda

[1] % of 2018-24 cumulative sales from recently launched and pipeline products.

[2] Therapeutic area represents 10% or more of company pharma revenue in 2017. Therapeutic areas based on Evaluate classification.
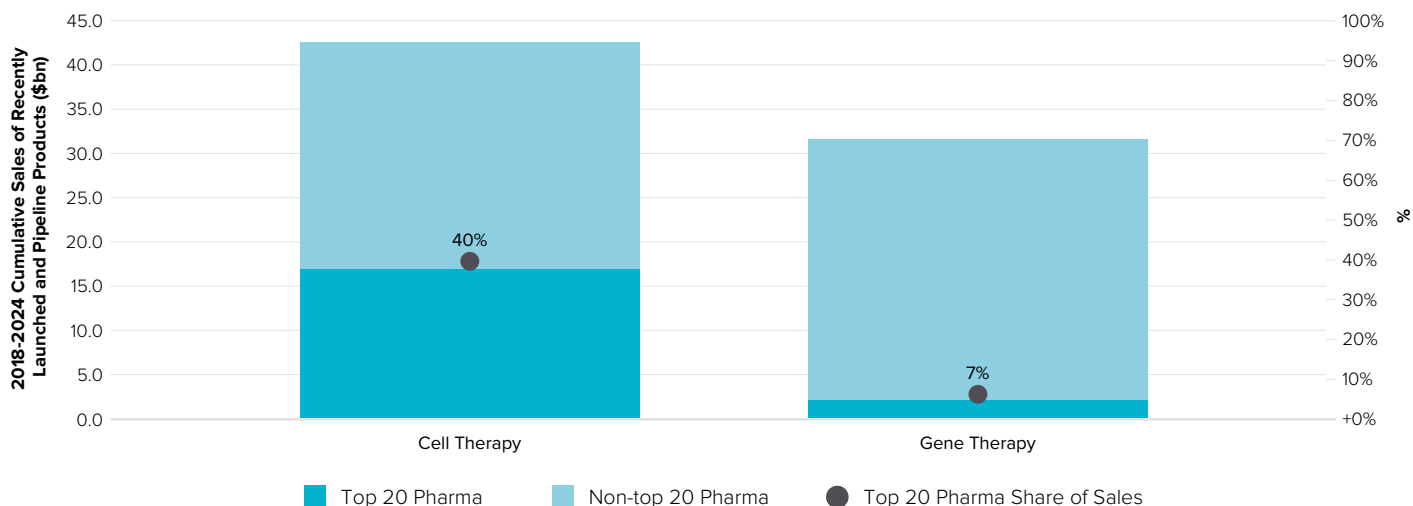
[3] Therapeutic area represents less than 10% of company pharma revenue in 2017. Therapeutic areas based on Evaluate classification.

[4] Company or product acquisition, in-licensing, joint venture.

Value Creation from Advanced Therapies

Source: Evaluate, May 2018

Value Creation from Advanced Therapies ($bn)

Source: Evaluate, May 2018

Rank	Company	Top 20 Pharma	Cumulative Sales 2018-24	Lead Product/s
1.	AveXis[1]	No	6.4	AVXS-101
2.	Gilead Sciences	Yes	5.5	Yescarta
3.	Celgene	Yes	5.4	JCAR017, bb2121[2]
4.	Athersys	No	5.4	MultiStem
5.	bluebird bio	No	5.3	LentiGlobin, bb2121[2]
6.	Spark Therapeutics	No	5.1	Luxturna[3], SPK-7001
7.	Novartis	Yes	5.1	Kymriah
8.	BioMarin Pharmaceutical	No	2.9	Valoctocogene Roxaparvovec
9.	Abeona Therapeutics	No	2.4	ABO-102
10.	Atara Biotherapeutics	No	1.8	Tabelecleucel

[1] Novartis completed its acquistion of AveXis on May 15th 2018.

[2] Co-development and co-promotion between Celgene and bluebird bio.

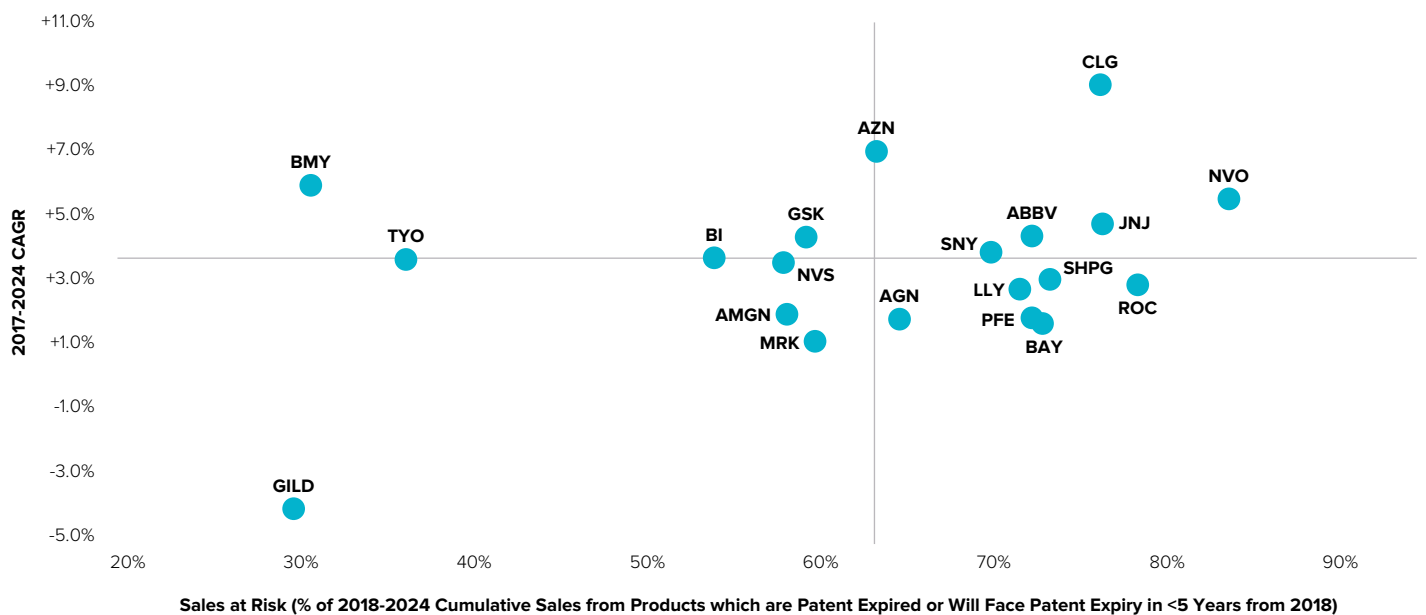[3] Exclusive non-US marketing rights held by Novartis.

Worldwide Pharma Innovation:
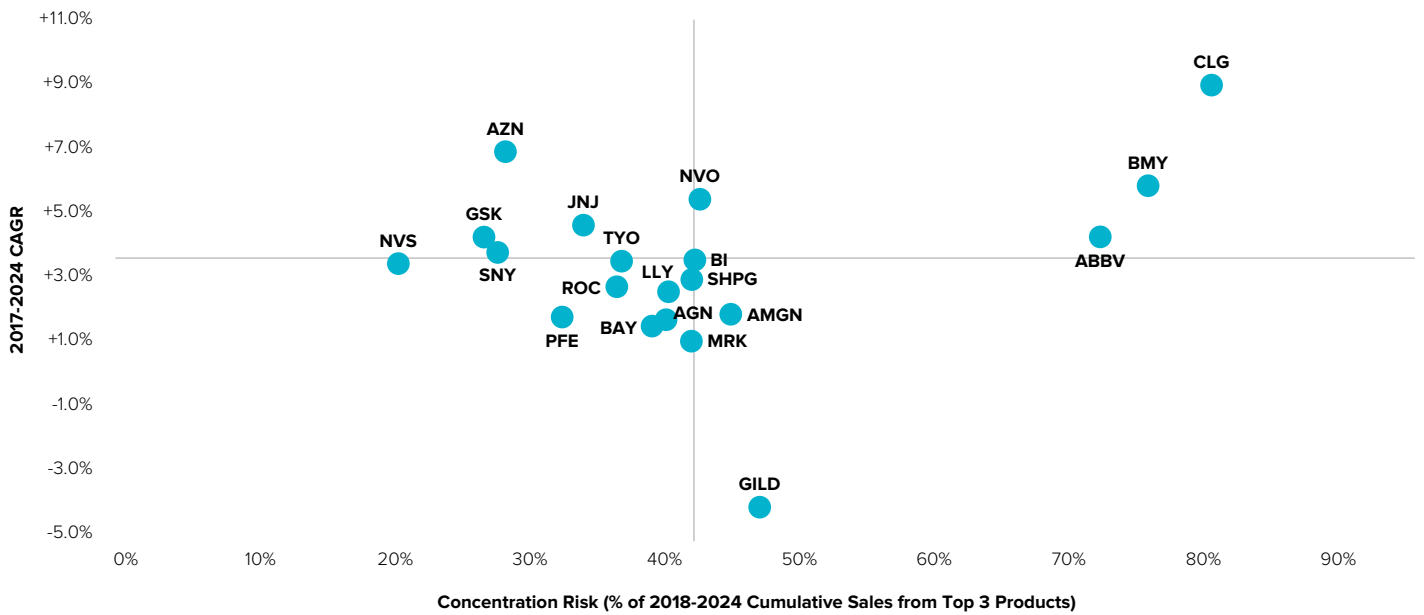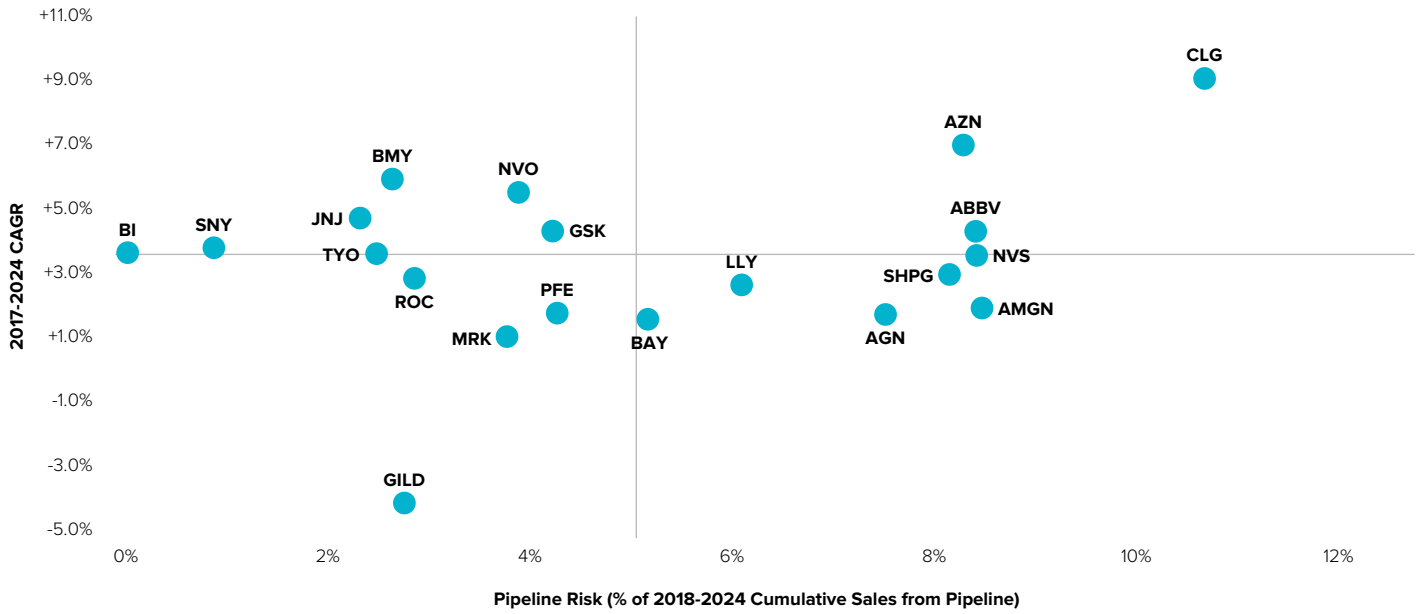# Portfolio Analysis

Novo Nordisk has the greatest sales at risk, Celgene has the highest CAGR over the forecast but also has the greatest pipeline risk and concentration risk.

Patent expiration of key brands within Novo Nordisk's diabetes portfolio prior to or during 2018-2024, mean that amongst the top 20 pharmaceutical companies, Novo Nordisk has the greatest sales at risk (83%). However, it should be noted that Novo Nordisk's high position here is also due to the fact that brokers continue to have relatively stable sales expectations for these patent expired products, likely due to the historical sales erosion seen for injected diabetes therapy. Gilead has the lowest sales at risk as revenue expectations for the company shift to its novel HIV portfolio.

While Celgene has the highest CAGR between 2017-2024 (9%), the company carries the greatest pipeline risk highlighting the company's reliance on sales revenue from its pipeline assets to meet broker forecast expectations. Celgene also has the highest sales concentration, based on the company's limited in market portfolio and, more importantly, the company's reliance on sales from Revlimid. Bristol-Myers Squibb and AbbVie also stand as outliers in terms of concentration risk, due to the over-weighted sales contribution of Eliquis and Opdivo for Bristol-Myers Squibb and Humira for AbbVie. However, this concentration risk is marginalised to a degree for Bristol-Myers Squibb as Eliquis and Opdivo remain patent protected throughout the forecast period, though they remain vulnerable to competitor risks.

Sales at Risk (% of 2018-2024 Cumulative Sales from Products which are Patent Expired or Will Face Patent Expiry in <5 Years from 2018)

ABBV = AbbVie, **AGN** = Allergan, **AMGN** = Amgen, **AZN** = AstraZeneca, **BAY** = Bayer, **BI** = Boehringer Ingleheim, **BMY** = Bristol-Myers Squibb, **CLG** = Celgene, **LLY** = Eli Lilly, **GILD** = Gilead Sciences, **GSK** = GlaxoSmithKline, **JNJ** = Johnson & Johnson, **MRK** = Merck & Co, **NVS** = Novartis, **NVO** = Novo Nordisk, **PFE** = Pfizer, **ROC** = Roche, **SNY** = Sanofi, **SHPG** = Shire, **TYO** = Takeda

2017-2024 CAGR (y-axis)

Pipeline Risk (% of 2018-2024 Cumulative Sales from Pipeline) (x-axis)

2017-2024 CAGR (y-axis)

Concentration Risk (% of 2018-2024 Cumulative Sales from Top 3 Products) (x-axis)

ABBV = AbbVie, **AGN** = Allergan, **AMGN** = Amgen, **AZN** = AstraZeneca, **BAY** = Bayer, **BI** = Boehringer Ingleheim, **BMY** = Bristol-Myers Squibb, **CLG** = Celgene, **LLY** = Eli Lilly, **GILD** = Gilead Sciences, **GSK** = GlaxoSmithKline, **JNJ** = Johnson & Johnson, **MRK** = Merck & Co, **NVS** = Novartis, **NVO** = Novo Nordisk, **PFE** = Pfizer, **ROC** = Roche, **SNY** = Sanofi, **SHPG** = Shire, **TYO** = Takeda

Worldwide Pharma Innovation: Return on Investment

Novo Nordisk's sharply focused portfolio delivers greatest return.

As previously found in last year's World Preview report, an analysis of Evaluate data assessing investment in R&D and M&A over a 10-year timeframe against the expected return proxied by Evaluate's NPV Analyzer shows that a focused-play strategy is more productive than a broad-play strategy. This is best indicated by Novo Nordisk and Celgene considering the companies' tightly focused portfolios.

Takeda's ranking with the second lowest RoI, may raise concerns amongst Takeda and Shire shareholders as to how effectively

Takeda will be able to generate shareholder value from its acquisition of Shire.

On average, the top 10 companies ranked with the highest RoI, have on average spent 35% of their total R&D and M&A investment on M&A. Conversely, amongst the bottom 10 ranked companies the average spent on M&A is 51% suggesting that organic growth provides greater return.

Pharma Top 20 Prescription Sales, RoI Analysis[1]
(RoI = Return on Investment[2])

Legend: Total R&D Investment | Total Deal/M&A Investment | RoI
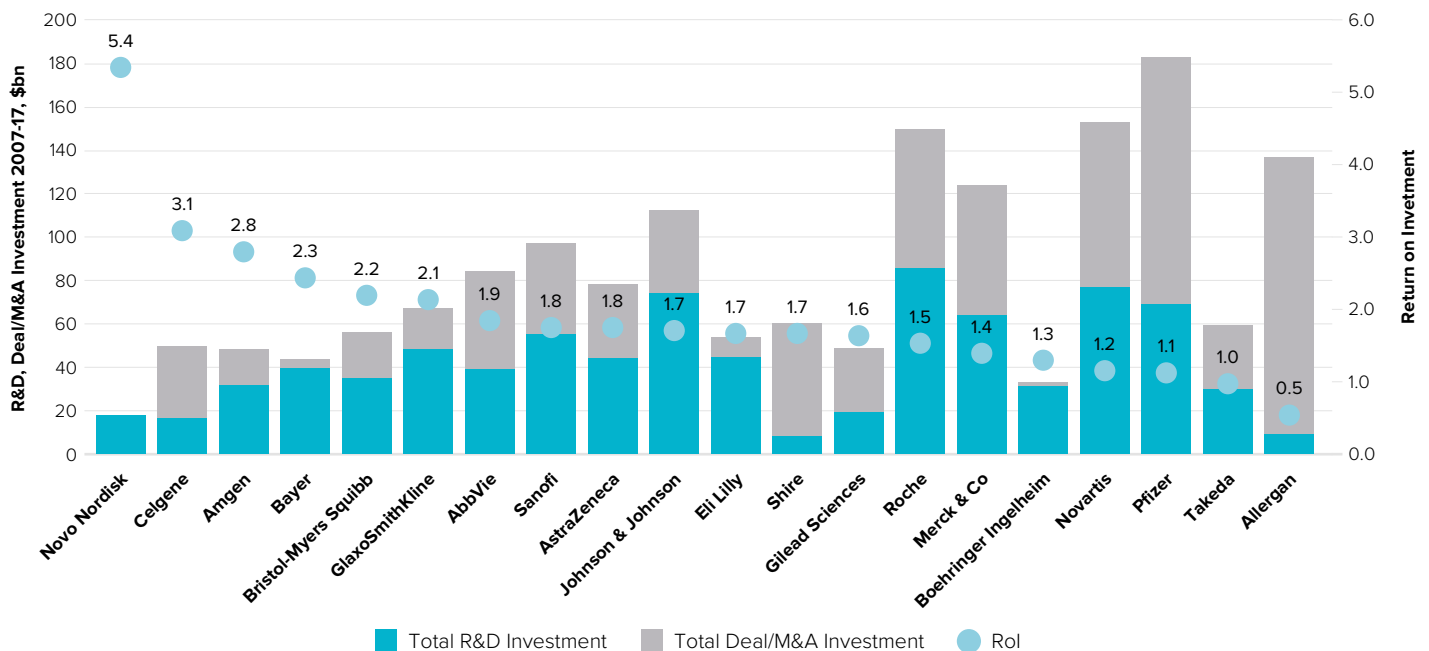
[1] Return on investment based on Evaluate's NPV Analyzer and disclosed investment in R&D and deal/M&A during the 2007-18 period (deals data until April 2018). Deals data only include pharma-related deals (e.g. deals in Medtech and Agrochemicals not included). The NPV value only takes into consideration products where a consensus forecast value exists. R&D spend for AbbVie also includes Abbott's R&D budget during the 2007-10 period.

[2] The RoI in this analysis should be interpreted as a prospective RoI based on future projections as it does not take into account the earnings gained in the past as the result of historical acquisitions (e.g. Enbrel contribution to Pfizer's bottom line following Wyeth's acquisition).

Top 20 Most Valuable R&D Projects (Ranked by Net Present Value)

Vertex's triple combination, VX-659 + Tezacaftor + Ivacaftor, is anticipated to be the most valuable project in the pharmaceutical industry pipeline.

Vertex's dominant position in the cystic fibrosis space is expected to be further strengthened by combining ivacaftor (available as Kalydeco) and tezacaftor (available in combination with ivacaftor as Symdeko) with VX-659, another cystic fibrosis transmembrane regulator (CFTR) corrector.

Last year's most valuable project, aducanumab, falls to third place as Biogen chases success in the Alzheimer's space. Based on failures to date, this is a high-risk strategy but has the potential for high rewards. NPV expectations for the drug could sharply change as more clinical data becomes available. Also joining from last year's list, AbbVie's upadacitinib maintains its anticipated high NPV with positive phase II and III trial results in rheumatoid arthritis throughout the past year.

Despite an abundance of oncology projects ranking among the highest valued in the pharmaceutical pipeline in previous years, a much broader range of therapy areas are now represented.

This is partially due to Johnson and Johnson's Erleada, Eli Lilly's Verzenio and Novartis's CAR-T cell therapy Kymriah all becoming marketed assets this year but signals a near-term change in pipeline assets generating the most value. Based on EvaluatePharma® therapeutic category classification, amongst the top 20 projects, blood therapies concentrated on rare diseases represent the highest total NPV, with product's like Biomarin's Valoctocogene Roxaparvovec and Shire's Landelumab expected to make an impact in the haemophilia A and hereditary angioedema markets respectively.

Amongst newly marketed products, Gilead's HIV treatment Biktarvy has seen its NPV more than double compared to last year and AbbVie's Mavyret has also enjoyed a similar valuation boost.

Amongst setbacks this past year, AbbVie has suffered the greatest loss, with Rova-T's NPV falling by $8.3bn due to negative results in the phase II Trinity study which was investigating the drug for third line treatment of DLL3-expressing relapsed/refractory small cell lung cancer.

Top 20 Most Valuable R&D Projects (Ranked by Net Present Value)

Source: Evaluate, May 2018

Rank	Product	Company	Phase (current)	Pharmacological Class	WW Product Sales ($m) 2024		Today's NPV ($m)
1.	VX-659 + Tezacaftor + Ivacaftor	Vertex Pharmaceuticals	Phase III	Cystic fibrosis transmembrane regulator (CFTR) potentiator & corrector	3,485	New Entry	13,070
2.	Upadacitinib	AbbVie	Phase III	Janus kinase (JAK) 1 inhibitor	2,570		9,878
3.	Aducanumab	Biogen	Phase III	Anti-beta-amyloid (Abeta) MAb	2,245		8,414
4.	Brolucizumab	Novartis	Phase III	Anti-vascular endothelial growth factor (VEGF) antibody fragment (Fab)	1,800	New Entry	8,123
5.	GSK2857916	GlaxoSmithKline	Phase II	Anti-B-cell maturation antigen (BCMA) antibody-drug conjugate	1,367	New Entry	7,498
6.	Lanadelumab	Shire	Filed	Anti-plasma kallikrein MAb	1,569		7,476
7.	ARGX-113	argenx	Phase II	Anti-neonatal Fc receptor (FcRn) MAb	1,941	New Entry	6,496
8.	Semaglutide Oral	Novo Nordisk	Phase III	Glucagon-like peptide (GLP) 1 agonist	1,994	New Entry	6,452
9.	JCAR017	Celgene	Phase II	Anti-CD19 chimeric antigen receptor (CAR) T cell therapy	1,154	New Entry	6,258
10.	BAF312	Novartis	Phase III	Sphingosine-1-phosphate (S1P) 1 & 5 modulator	1,541	New Entry	5,814
11.	Elafibranor	Brokers Forecasting an Undisclosed Licensing Partner	Phase III	Peroxisome proliferator activated receptor (PPAR) alpha & delta agonist	1,670	New Entry	5,691
12.	Risankizumab	AbbVie	Phase III	Anti-IL-23 MAb	2,114	New Entry	5,495
13.	AVXS-101	AveXis	Phase III	Survival motor neuron (SMN) gene therapy	1,788	New Entry	5,453
14.	Elafibranor	GENFIT	Phase III	Peroxisome proliferator activated receptor (PPAR) alpha & delta agonist	1,200	New Entry	5,422
15.	Luspatercept	Celgene	Phase III	Activin receptor (ACVR) type 2b antagonist	1,168	New Entry	5,050
16.	LentiGlobin	bluebird bio	Phase III	Beta-globin gene therapy	1,615	New Entry	4,746
17.	Valoctocogene Roxaparvovec	BioMarin Pharmaceutical	Phase III	AAV-factor VIII gene therapy	1,318	New Entry	4,573
18.	Patisiran	Alnylam Pharmaceuticals	Filed	Transthyretin (TTR) RNAi therapeutic	1,308	New Entry	4,473

Rank	Product	Company	Phase (current)	Pharmacological Class	WW Product Sales ($m) 2024		Today's NPV ($m)	
19.	**CX-072**	CytomX Therapeutics	Phase II	Anti-programmed cell death ligand-1 (PD-L1) probody	1,153	New Entry	**4,159**	
20.	**Aimovig**	Amgen	Filed	Anti-calcitonin gene-related peptide (CGRP) MAb	1,178	New Entry	**4,028**	
	Top 20				34,177		**128,569**	
	Other				178,245		448,421	
	Total				212,422		**576,990**	**13%**
				NPV of R&D Pipeline JUN 2017:			**509,097**	

Most Valuable R&D Projects (Ranked by NPV) in June 2017 Which Have Since Been Approved or Launched

Change vs. June 2017	Product	Company	Status (June 2017)	Status Change Since June 2017	June 2017 NPV ($m)	Today's NPV ($m)	Change vs. June 2017 (%)
Approved	**Erleada**	Johnson & Johnson	Phase III	Marketed	9,839	**9,859**	0%
	Verzenio	Eli Lilly	Phase III	Marketed	8,840	**7,629**	-14%
	Yescarta	Gilead Sciences	Filed	Marketed	7,427	**4,779**	-36%
	Biktarvy	Gilead Sciences	Phase III	Marketed	7,178	**18,607**	159%
	Ozempic	Novo Nordisk	Filed	Marketed	6,943	**9,663**	39%
	Tremfya	Johnson & Johnson	Filed	Marketed	6,392	**12,775**	100%
	Hemlibra	Roche	Phase III	Marketed	6,129	**12,598**	106%
	Kymriah	Novartis	Filed	Marketed	4,794	**5,605**	17%
	Shingrix	GlaxoSmithKline	Filed	Marketed	4,321	**4,619**	7%
	Mavyret	AbbVie	Filed	Marketed	4,066	**11,580**	185%
				Sub-Total	**65,929**	**97,714**	**48%**

Most Valuable R&D Projects (Ranked by NPV in June 2017) Which Have Since Suffered Setbacks

Change vs. June 2017	Product	Company	Status (June 2017)	Status Change Since June 2017	Reason for setback	June 2017 NPV ($m)	Today's NPV ($m)	Change vs. June 2017 (%)
Setback	**Rova-T**	AbbVie	Phase II	Phase III	Trinity PII study in third-line SCLC fails	8,486	**193**	-98%
	Ozanimod	Celgene	Phase III	Filed	FDA issue a "Refusal to File" letter	8,174	**3,622**	-56%
	Epacadostat	Incyte	Phase III	Phase III	ECHO-301 PIII trial in melanoma fails	5,866	**0**	-100%
	Plivensia	Johnson & Johnson	Filed	Abandoned - Filed	FDA declines approval	5,423	**0**	-100%
	Tremelimumab	AstraZeneca	Phase III	Phase III	ARCTIC PIII trial in third-line NSCLC fails	4,302	**1,301**	-70%
	Lampalizumab	Roche	Phase III	Abandoned - Phase III	PIII studies in geographic atrophy fail	4,063	**0**	-100%
					Sub-Total	**36,313**	**5,116**	**-86%**
Total						**102,242**	**102,830**	**1%**

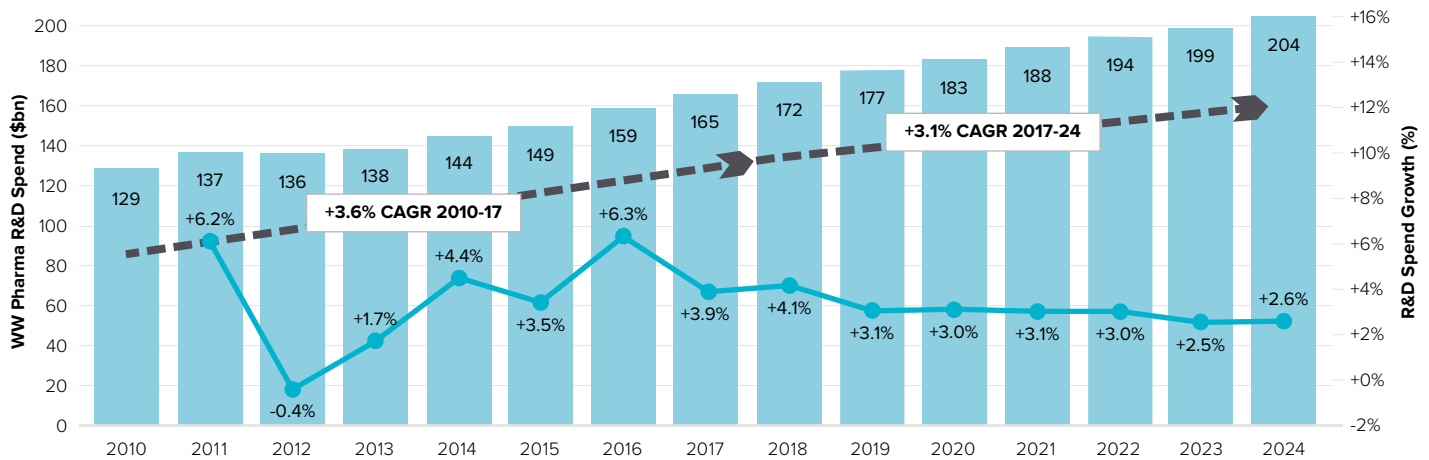# Worldwide R&D Spend by Pharma & Biotech Companies (2010-2024)

Forecast worldwide R&D CAGR lower in 2018 through 2024 and proportion of R&D spend to pharmaceutical revenue to reduce.

Worldwide pharmaceutical R&D spend totalled $165bn in 2017 representing an increase of +3.9% on the previous year. Going forward, R&D spend is forecast to grow at a CAGR of 3.1% to 2024. This is lower than the CAGR of 3.6% between 2010 and 2017. Similarly, the average annual proportion of forecast R&D spend to pharmaceutical revenue is expected to be 18.9%, lower than the 19.5% observable between 2010 and 2017. This reduction signals expectations that proportionally either companies will be improving R&D efficiencies or perhaps, that less revenue will be directed towards replenishing pipelines.

The industry is increasingly looking towards employing big data and predictive analytics to improve R&D efficiency and help stay ahead in an era demanding more patient focused drug development. The applicability of big data and predictive analytics spans across multiple facets including transforming biological modelling for target selection and lead optimisation (in early stage R&D), enabling population segmentation to inform the target product profile of the asset, and refining clinical trial design, recruitment, efficacy and safety signal tracking. All improving the efficiency of drug development, allowing enhanced preclinical validation and more focused clinical programmes.

Worldwide Total Pharmaceutical R&D Spend in 2010-2024

Source: Evaluate, May 2018

Worldwide R&D Spend by Pharma & Biotech Companies (2010-2024)

Source: Evaluate, May 2018

Year	WW Prescription Sales ($bn)														
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Pharma R&D Spend	128.6	136.5	136.0	138.3	144.4	149.4	158.9	165.1	171.9	177.2	182.6	188.3	193.9	198.8	203.9
Growth per Year		+6.2%	-0.4%	+1.7%	+4.4%	+3.5%	+6.3%	+3.9%	+4.1%	+3.1%	+3.0%	+3.1%	+3.0%	+2.5%	+2.6%
WW Prescription Sales	687	733	720	727	751	743	769	789	830	872	926	997	1,070	1,134	1,204
R&D as % of WW Prescription Sales	18.7%	18.6%	18.9%	19.0%	19.2%	20.1%	20.7%	20.9%	20.7%	20.3%	19.7%	18.9%	18.1%	17.5%	16.9%
Generics	60	66	67	70	76	78	80	81	84	89	95	100	104	109	114
Prescription excl. Generics	627	667	653	657	675	666	688	708	746	782	832	898	965	1,025	1,090
R&D as % of Prescription excl. Generics	20.5%	20.5%	20.8%	21.0%	21.4%	22.4%	23.1%	23.3%	23.0%	22.6%	22.0%	21.0%	20.1%	19.4%	18.7%

CAGR 2017-24 on Pharma R&D Spend +3.1%. Cumulative 10 year R&D Spend (2008-17) $1,412bn.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of NMEs	28	29	25	31	35	26	35	44	35	51	56	27	55
Spend per NME ($bn)	3.4	3.7	4.8	4.1	3.6	4.9	3.9	3.1	4.0	2.8	2.7	5.9	3.0
Spend per NME ($bn) (3 year lag)*				3.1	3.1	4.6	3.7	2.9	3.7	2.7	2.4	5.1	2.6

Note: Forecast pharmaceutical research and development spend based on a consensus of leading equity analysts' estimates for company level R&D spend, extrapolated to pharmaceutical R&D when a company has non-pharmaceutical R&D activity.

*Spend per NME ($bn) (3 year lag) uses the R&D expense for 3 years prior to the NME approval instead of the same year. e.g. the 2017 figure of $2.6bn is the R&D expense in 2014 divided by the number of NMEs in 2017.

Pharmaceutical R&D Spend in 2024: Top 20 Companies

**Roche leads as biggest spender on pharmaceutical R&D in 2024.**

EvaluatePharma® finds that Roche maintains its position as the top forecasted spender on R&D in 2024, with a spend of $11.7bn, with forecasts likely driven by its historically intense R&D operations and estimates of the trial programmes needed by Roche within its core oncology business to ensure continued label expansions

after initial approvals.

Novartis has fallen from second biggest spender to third biggest spender, having been overtaken by Johnson & Johnson. Celgene continues to have the highest growth in pharma R&D of the top 20. Overall, total R&D spend is expected to increase by 3.0% each year, reaching $203.9bn in 2024.

Pharmaceutical R&D in 2024: Top 10 Companies

Source: Evaluate, May 2018
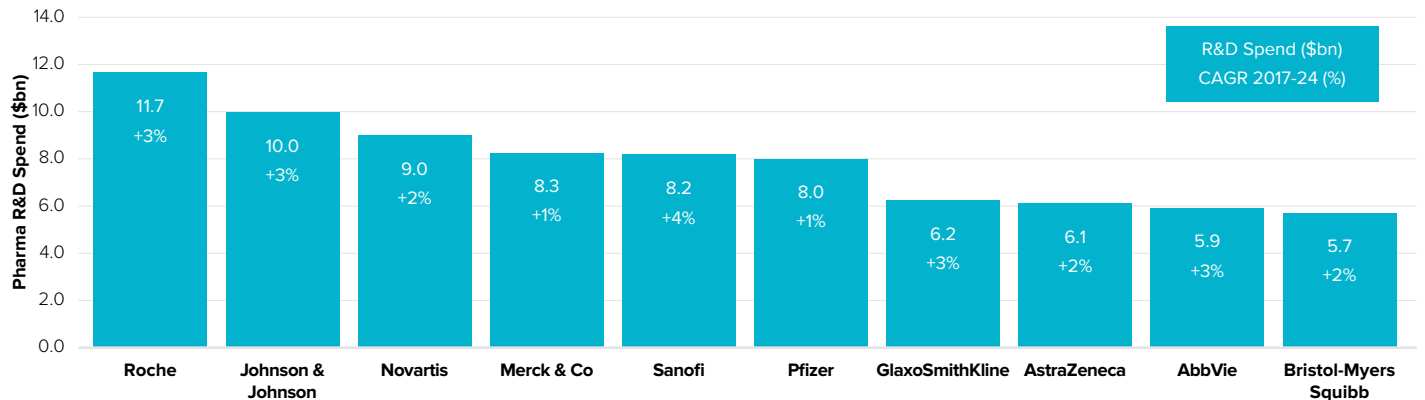
Pharmaceutical R&D Spend (2017 & 2024): Top 20 Companies & Total Market

Source: Evaluate, May 2018

| Rank | Company | Pharma R&D ($bn) | | CAGR 2017-24 | R&D As a % of Prescription Sales | | Chg. (+/-) |
		2017	2024		2017	2024	
1.	Roche	9.2	11.7	+3%	22.0%	23.0%	+1.0pp
2.	Johnson & Johnson	8.4	10.0	+3%	24.3%	21.0%	-3.3pp
3.	Novartis	7.8	9.0	+2%	18.7%	16.9%	-1.7pp
4.	Merck & Co	7.6	8.3	+1%	21.4%	21.8%	+0.4pp
5.	Sanofi	6.2	8.2	+4%	18.1%	18.5%	+0.3pp
6.	Pfizer	7.6	8.0	+1%	16.8%	15.7%	-1.1pp
7.	GlaxoSmithKline	5.0	6.2	+3%	17.4%	16.2%	-1.2pp
8.	AstraZeneca	5.4	6.1	+2%	27.4%	19.2%	-8.2pp
9.	AbbVie	4.8	5.9	+3%	17.4%	15.9%	-1.5pp
10.	Bristol-Myers Squibb	4.8	5.7	+2%	25.0%	19.9%	-5.1pp
11.	Eli Lilly	5.0	5.4	+1%	26.8%	24.4%	-2.4pp
12.	Celgene	3.0	4.5	+6%	23.3%	18.9%	-4.5pp
13.	Amgen	3.5	4.1	+2%	16.0%	16.5%	+0.5pp
14.	Boehringer Ingelheim	3.1	4.1	+4%	21.5%	22.3%	+0.8pp
15.	Bayer	3.3	4.0	+3%	18.4%	20.0%	+1.6pp
16.	Gilead Sciences	3.5	3.5	-0%	13.7%	18.3%	+4.5pp
17.	Takeda	2.9	3.3	+2%	21.6%	19.5%	-2.2pp
18.	Novo Nordisk	2.1	3.1	+6%	12.5%	12.6%	+0.1pp
19.	Regeneron Pharmaceuticals	2.1	3.0	+5%	55.8%	67.2%	+11.4pp
20.	Astellas Pharma	2.0	2.4	+3%	18.3%	18.9%	+0.6pp
	Total Top 20	97.2	**116.4**	+2.6%	21.5%	20.6%	-0.9pp
	Other	67.9	**87.5**	+3.7%			
	Total	165.1	**203.9**	+3.0%	20.9%	16.9%	-4.0pp

Note: Forecasted pharmaceutical R&D spend based on a consensus of leading equity analysts's estimates for company-level R&D spend.

FDA New Drug Approval Analysis
NMEs & Biologicals (2002-2017)

Following the drop in 2016 NME approvals 2017 suggests a return to form in industry R&D productivity. A record 55 NME's were approved with fifth year US sales post launch forecast to reach $33.2bn.

R&D value creation seems to be at an all-time high with total USA sales 5 years post launch for products approved in 2017 reaching $33.2bn, led by Sanofi's Dupixent in atopic dermatitis and Roche's Ocrevus in multiple sclerosis. Other 2017 potential blockbusters span a breadth of therapeutic areas including oncology (Imfinzi and Kisqali), diabetes (Ozempic), haemophilia A (Hemlibra), hepatitis C (Mavyret) and psoriasis (Tremfya). The majority of these were granted priority review, highlighting forecast commercial success

is aligned to delivering significant improvements over the current standard of care and the industry is increasingly focused on ensuring pipeline assets meet this benchmark.

2017 also saw the approval of innovative gene and cell therapies including the approval of Novartis's Kymriah in acute lymphocytic leukaemia, marking the first approval CAR-T cell therapy. Gilead followed suit following its acquisition of Kite Pharma, as Yescarta became the second CAR-T cell therapy to be approved. Spark Therapeutics' gene therapy Luxturna was approved in late 2017 for vision loss. These landmark approvals pave the way for more advanced therapy approvals in the years to come.

FDA Approval Count vs. Total USA Product Sales 5 Years After Launch

Source: Evaluate, May 2018
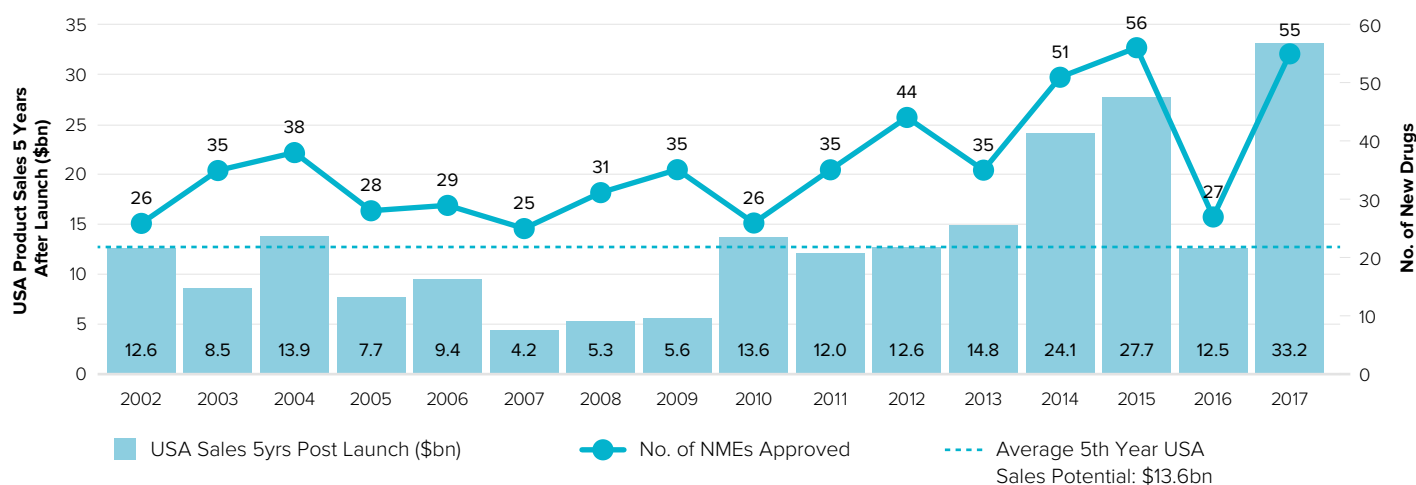
Key Approvals in Top 7 Years

2002 – Neulasta (AMGN), Abilify (Otsuka/BMS), Zetia (MRK/SGP), Humira (ABT)
2004 – Avastin (Roche), Cymbalta (LLY), Spiriva (BI/PFE), Lyrica (PFE)
2013 – Tecfidera (BIIB), Imbruvica (ABBV), Invokana (JNJ), Tivicay (GSK)
2014 – Keytruda (MRK), Opdivo (BMY), Otezla (Celgene), Trulicity (LLY)

2015 – Ibrance (PFE), Darzalex (JNJ), Genvoya (GILD), Cosentyx (NVS)
2016 – Tecentriq (Roche), Venclexta (ABBV/Roche), Taltz (LLY), Xiidra (Shire)
2017 – Ocrevus (Roche), Dupixent (Sanofi), Ozempic (Novo Nordisk), Tremfya (JNJ)

FDA Approval Count (NMEs & Biologicals) vs. 5th Year after Launch USA Product Sales

Source: Evaluate, May 2018

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No. of NMEs Approved	17	21	31	18	18	16	21	20	15	24	34	25	30	33	15	36
No. of Biologicals Approved	9	14	7	10	11	9	10	15	11	11	10	10	21	23	12	19
Total NMEs + Biologicals	**26**	**35**	**38**	**28**	**29**	**25**	**31**	**35**	**26**	**35**	**44**	**35**	**51**	**56**	**27**	**55**
% Chg.		+35%	+9%	-26%	+4%	-14%	+24%	+13%	-26%	+35%	+26%	-20%	+46%	+10%	-52%	+104%
USA Sales 5yrs Post Launch $bn	12.6	8.5	13.9	7.7	9.4	4.2	5.3	5.6	13.6	12.0	12.6	14.8	24.1	27.7	12.5	33.2
% Chg.		-33%	+63%	-44%	+22%	-55%	+24%	+6%	+145%	-12%	+4%	+17%	+63%	+15%	-55%	+165%
5yr USA Sales per Approval $m	485	242	365	275	324	170	170	159	523	344	286	421	472	495	463	603
% Chg.		-50%	+50%	-25%	+18%	-47%	-0%	-6%	+229%	-34%	-17%	+47%	+12%	+5%	-6%	+30%

Note: The number of biologicals approved include biologicals from both CDER and CBER. In 2017 there were 12 CDER biologicals approved and EvaluatePharma estimates that there were 7 novel CBER biologicals approved: Heplisav-B, Kedrab, Kymriah, Luxturna, Rebinyn, Shingrix and Yescarta.

Top 10 New Molecular Entities in 2017: Ranked on USA Consensus Sales in 2022

Source: Evaluate, May 2018

Rank	Product	Company	Approved	Review Status	USA Sales ($m) 2017	2022
1.	**Dupixent**	Sanofi	Mar 2017	Priority review	244	4,001
2.	**Ocrevus**	Roche	Mar 2017	Priority review	874	3,870
3.	**Ozempic**	Novo Nordisk	Dec 2017	Standard	-	2,114
4.	**Tremfya**	Johnson & Johnson	Jul 2017	Priority review	39	1,932
5.	**Mavyret**	AbbVie	Aug 2017	Standard	315	1,822
6.	**Imfinzi**	AstraZeneca	May 2017	Priority review	19	1,562
7.	**Hemlibra**	Roche	Nov 2017	Priority review	3	1,523
8.	**Ingrezza**	Neurocrine Biosciences	Apr 2017	Priority review	117	1,174
9.	**Kisqali**	Novartis	Mar 2017	Priority review	66	972
10.	**Verzenio**	Eli Lilly	Sep 2017	Priority review	21	967
	Other				834	13,234
	Total				**2,531**	**33,171**

Note: Sales forecasts based on a consensus of leading equity analysts' estimates.
Tremfya USA sales figures for 2017 are estimated.

Worldwide Prescription Drug & OTC Sales by Therapy Area in 2024

Oncology shows rapid growth of $129bn during the 2017-24 period.

EvaluatePharma® finds oncology will be the dominant therapy segment in 2024 with sales reaching $233bn in 2024 and an expected CAGR of 12.2% per year. Keytruda remains one of the largest growth drivers through 2024 alongside Tecentriq, Ibrance and Opdivo.
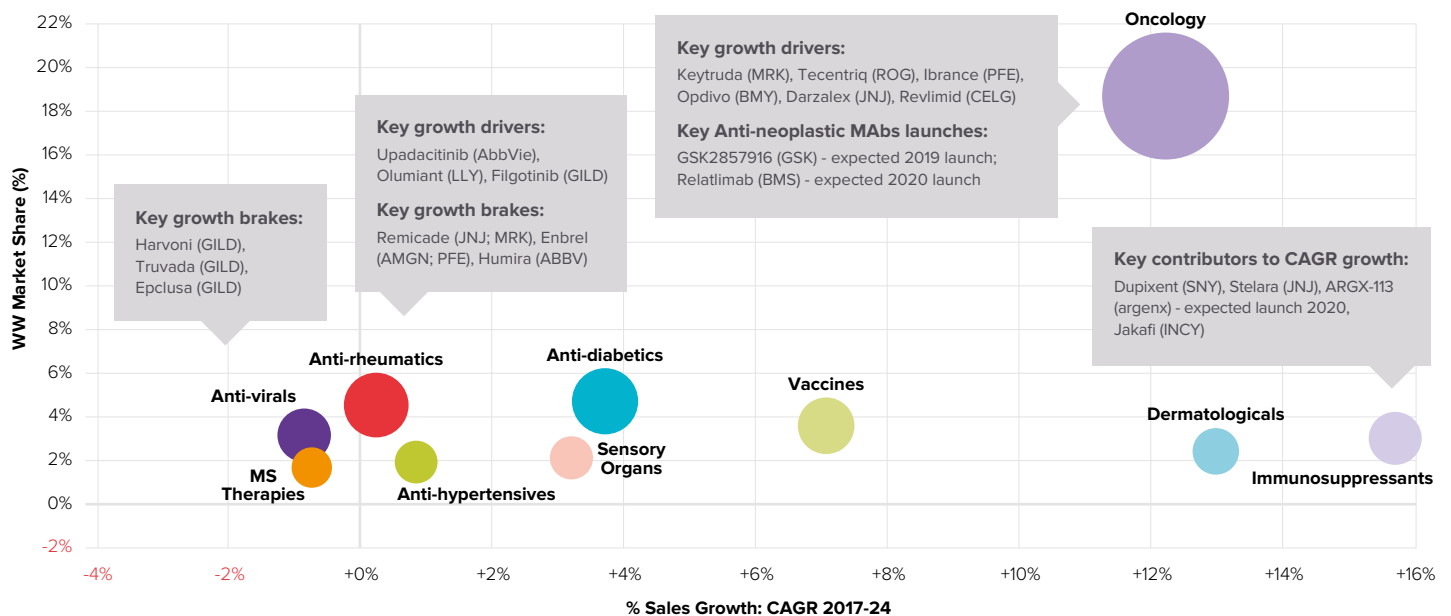
Anti-diabetics is forecast to remain the second biggest therapy area with sales of $60bn in 2024, with Novo Nordisk's diabetes portfolio in particular responsible for driving growth. The anti-rheumatic therapy area fills out the top three, with the size of the market static, helped by the continued uptake and launches of JAK inhibitors and delayed biosimilar competition to Enbrel and Humira in the USA.

The antivirals therapy space is set to see the largest decline primarily driven by shrinking addressable market and pricing constraints within the HCV space. The continued uptake and launch of novel HIV antivirals like Biktarvy do act as a counterbalance to stabilise the sales decline. Contrary to this, the therapy area showing the largest CAGR through 2024 is immunosuppressants, driven by Sanofi's Dupixent and Johnson & Johnson's Stelara.

Top 10 Therapy Areas in 2024, Market Share & Sales Growth

Source: Evaluate, May 2018

Key growth brakes: Harvoni (GILD), Truvada (GILD), Epclusa (GILD)

Key growth drivers: Upadacitinib (AbbVie), Olumiant (LLY), Filgotinib (GILD)

Key growth brakes: Remicade (JNJ; MRK), Enbrel (AMGN; PFE), Humira (ABBV)

Key growth drivers: Keytruda (MRK), Tecentriq (ROG), Ibrance (PFE), Opdivo (BMY), Darzalex (JNJ), Revlimid (CELG)

Key Anti-neoplastic MAbs launches: GSK2857916 (GSK) - expected 2019 launch; Relatlimab (BMS) - expected 2020 launch

Key contributors to CAGR growth: Dupixent (SNY), Stelara (JNJ), ARGX-113 (argenx) - expected launch 2020, Jakafi (INCY)

Worldwide Prescription Drug & OTC Sales by Evaluate Therapy Area (2017 & 2024): Top 15 Categories & Total Market

Source: Evaluate, May 2018

Rank	Therapy Area	WW Sales ($bn)		CAGR % Growth	WW Market Share		Chg. (+/-)	Rank Chg. (+/-)
		2017	2024		2017	2024		
1.	Oncology	104.0	233.0	+12.2%	12.6%	18.6%	+6.0pp	+0
2.	Anti-diabetics	46.1	59.5	+3.7%	5.6%	4.8%	-0.8pp	+1
3.	Anti-rheumatics	55.7	56.7	+0.2%	6.8%	4.5%	-2.2pp	-1
4.	Vaccines	27.7	44.6	+7.1%	3.4%	3.6%	+0.2pp	+1
5.	Anti-virals	42.4	39.9	-0.9%	5.1%	3.2%	-1.9pp	-1
6.	Immunosuppressants	13.7	38.1	+15.7%	1.7%	3.0%	+1.4pp	+5
7.	Bronchodilators	27.2	32.3	+2.5%	3.3%	2.6%	-0.7pp	-1
8.	Dermatologicals	12.9	30.3	+13.0%	1.6%	2.4%	+0.9pp	+4
9.	Sensory Organs	21.6	26.9	+3.2%	2.6%	2.2%	-0.5pp	+0
10.	Anti-hypertensives	23.0	24.4	+0.8%	2.8%	2.0%	-0.8pp	-3

Rank	Therapy Area	WW Sales ($bn) 2017	WW Sales ($bn) 2024	CAGR % Growth	WW Market Share 2017	WW Market Share 2024	Chg. (+/-)	Rank Chg. (+/-)
11.	**Anti-coagulants**	16.8	22.9	+4.6%	2.0%	1.8%	-0.2pp	-1
12.	**MS therapies**	22.7	21.5	-0.8%	2.7%	1.7%	-1.0pp	-4
13.	**Anti-fibrinolytics**	12.7	20.4	+7.1%	1.5%	1.6%	+0.1pp	+0
14.	**Anti-hyperlipidaemics**	11.3	16.4	+5.5%	1.4%	1.3%	-0.1pp	+0
15.	**Anti-anaemics**	7.6	15.7	+11.0%	0.9%	1.3%	+0.3pp	+3
	Top 15	445	683	+6.3%	54.0%	54.6%	+0.6pp	
	Other	379	567	+5.9%	46.0%	45.4%	-0.6pp	
	Total WW Prescription & OTC Sales	**825**	**1,249**	+6.1%	100.0%	100.0%		
	Total 'Prescription & OTC Sales' includes:							
	WW Generic Sales	**80.7**	**113.7**	+5.0%	9.8%	9.1%	-0.7%	
	OTC Pharmaceuticals	**36.1**	**45.9**	+3.5%	4.4%	3.7%	-0.7%	

Note: Sales in 2017 based on company reported data. Sales forecasts to 2024 based on a consensus of leading equity analysts' estimates for product sales and segmental sales.

Oncology Market to 2024

Same story at the top, but a new chapter for the rest of the industry?

In 2024, five of the top 10 companies in oncology will hold their 2017 position, including Roche—the market leader. Nonetheless, Roche's market share is forecast to decline by 14.5% from 2017 to 2024 with a CAGR of only 0.2%, lower than the 12% average for the other nine companies in the top 10. The low growth is due to expected biosimilar erosion of key products (Avastin, Rituxan, Herceptin) and the company being late to market in the PD-1/PDL-1 space with Tecentriq (third-to-market). However, Roche has made steps this year to combat stagnancy with multiple deals in oncology, including acquiring Ignyta (gaining multiple novel oncology compounds) and Flatiron (a big data analytics company focused on oncology health records).

Outside the top 10, the rest of the industry is expected to have a CAGR of 22%, bringing their market share in 2024 up to 39.7% from 21.5% in 2017. Highlighting the high value potential targets for future M&A activity.

Unsurprisingly, the PD-1 inhibitors, Keytruda and Opdivo, appear amongst the top five oncology products in 2024. Keytruda has ascended from third to first position this year overtaking Opdivo, while Opdivo has fallen from second to third. A primary driver of this change is Keytruda's approval in the USA and EU for use in first-line locally advanced or metastatic NSCLC, an approval Opdivo does not have.

Not one of the R&D products in the top five remains from last year. Notably, epacadostat, which was ranked in second place last year, no longer has any forecasted sales due to recent negative clinical data for this product from the ECHO-301 trial, which was examining epacadostat in combination with Keytruda in unresectable or metastatic melanoma. All top five products are in phase II development and from diverse pharma classes, suggesting a robust innovative in the pipeline. Tipifarnib, the lead product is the first-in-class farnesyl transferase inhibitor, while JCAR017, if approved, will join other CAR-T therapies already on the market.

Worldwide Sales, Market Share & Sales Growth (2017-2024)

Source: Evaluate, May 2018
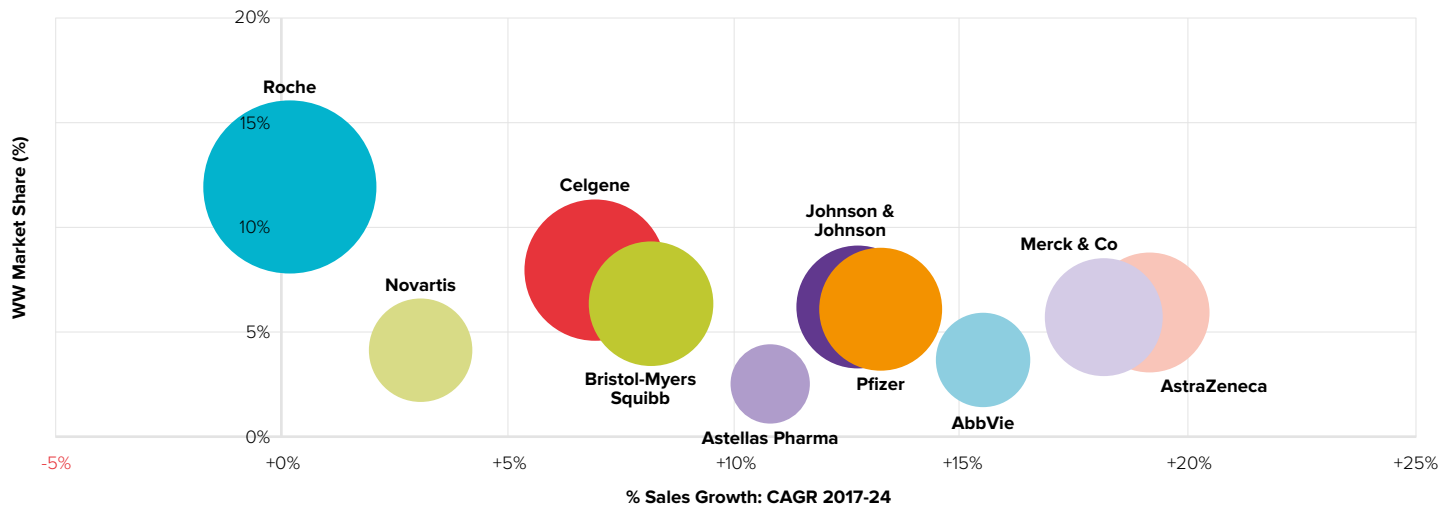
Note: Bubble = WW Sales in 2024

Top 10 Companies & Total Worldwide Oncology Sales (2017-2024)

Source: Evaluate, May 2018

Rank	Company	WW Sales ($m)		CAGR 2017-24	WW Market Share		Rank Chg. 2017-24
		2017	2024		2017	2024	
1.	**Roche**	27,453	**27,820**	+0.2%	26.4%	11.9%	-
2.	**Celgene**	11,649	**18,552**	+7%	11.2%	8.0%	-
3.	**Bristol-Myers Squibb**	8,520	**14,713**	+8%	8.2%	6.3%	-
4.	**Johnson & Johnson**	6,153	**14,306**	+13%	5.9%	6.1%	+1
5.	**Pfizer**	5,861	**14,031**	+13%	5.6%	6.0%	+1
6.	**AstraZeneca**	4,024	**13,732**	+19%	3.9%	5.9%	+2
7.	**Merck & Co**	4,111	**13,214**	+18%	4.0%	5.7%	-
8.	**Novartis**	7,884	**9,715**	+3%	7.6%	4.2%	-4
9.	**AbbVie**	3,090	**8,471**	+15%	3.0%	3.6%	+1
10.	**Astellas Pharma**	2,847	**5,830**	+11%	2.7%	2.5%	+1
	Top 10	81,592	**140,384**	8%	78.5%	60.3%	
	Other	22,396	**92,605**	22%	21.5%	39.7%	
	Total Industry	103,988	**232,989**	12%	100.0%	100.0%	

Top 5 Oncology Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m)		CAGR 2017-24	WW Market Share		Current Status
					2017	2024		2017	2024	
1.	Keytruda	pembrolizumab	**Merck & Co + Otsuka Holdings**	Anti-programmed cell death-1 (PD-1) MAb	3,823	**12,686**	19%	4%	5%	Marketed
2.	Revlimid	lenalidomide	**Celgene + BeiGene**	Immunomodulator	8,191	**11,931**	6%	8%	5%	Marketed
3.	Opdivo	nivolumab	**Bristol-Myers Squibb + Ono Pharmaceutical**	Anti-programmed cell death-1 (PD-1) MAb	5,725	**11,247**	10%	6%	5%	Marketed
4.	Imbruvica	ibrutinib	**AbbVie + Johnson & Johnson**	Bruton's tyrosine kinase (BTK) inhibitor	3,196	**9,557**	17%	3%	4%	Marketed
5.	Ibrance	palbociclib	**Pfizer**	Cyclin-dependent kinase (CDK) 4 & 6 inhibitor	3,126	**8,284**	15%	3%	4%	Marketed

Oncology includes: Alkaloids, Alkylating agents, Anti-metabolites, Anti-neoplastic MAbs, Cytotoxic antibiotics, Hormone therapies, Platinum compounds and other anti-cancer. Excludes anti-emetics and anti-anaemics used in chemotherapy-induced anaemia. Also excludes: Interferons, Immunostimulants & Immunosuppressants.

Top 5 Oncology R&D Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m) 2024	WW Market Share 2024	Current Status
1.	Tipifarnib	tipifarnib	**Kura Oncology + Undisclosed Licensing Partner**	Farnesyl transferase inhibitor	**1,665**	0.7%	Phase II
2.	Tazemetostat	tazemetostat	**Epizyme**	Histone-lysine N-methyltransferase (MLL2) enhancer of zeste homolog 2 (EZH2) inhibitor	**1,408**	0.6%	Phase II
3.	GSK2857916	-	**GlaxoSmithKline**	Anti-B-cell maturation antigen (BCMA) antibody-drug conjugate	**1,367**	0.6%	Phase II
4.	CB-839	-	**Calithera Biosciences + Undisclosed Licensing Partner**	Glutaminase inhibitor	**1,262**	0.5%	Phase II
5.	JCAR017	lisocabtagene maraleucel	**Celgene**	Anti-CD19 chimeric antigen receptor (CAR) T cell therapy	**1,154**	0.5%	Phase II

Product Segment Contribution to Sales in 2024
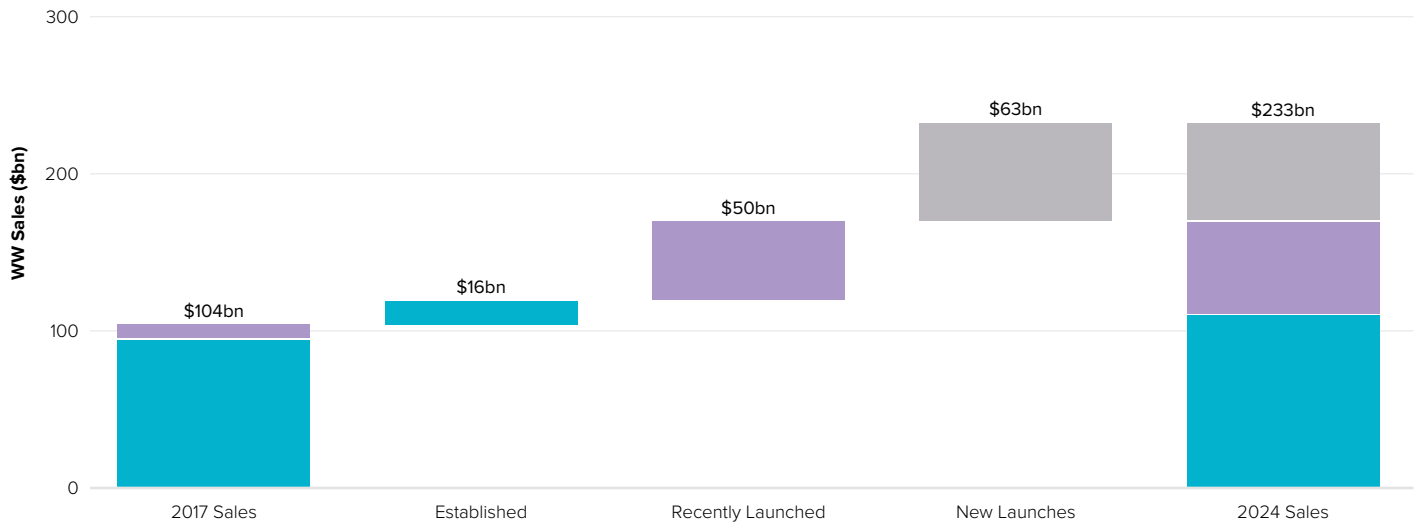
Note: Established: Launched prior to 2015 | Recently launched: 2015 to 2017 inclusive | New launches: New launches expected from 2018 | 2017 and 2024 sales reflect the sum of these categories.

Anti-Diabetics Market to 2024

Novo Nordisk expected to retain their dominance in the diabetes field in 2024.

EvaluatePharma® finds that Novo Nordisk is set to solidify its position as the leader in the anti-diabetic market through 2024, increasing its market share from 29.7% in 2017 to 35.3% in 2024. The company's once weekly GLP-1 agonist, Ozempic, and its pipeline oral formulation, as well as continuing growth for its insulin degludec portfolio (Tresiba, Xultropy, Ryzodeg) will drive this consolidation.

Eli Lilly is expected to retain its second position with an expected 2024 market share of 14.2% and 3% CAGR, primarily due to continuing growth of its own GLP-1 agonist, Trulicity, which is forecast to be the biggest selling product in diabetes by 2024.

Sanofi will face increasing biosimilar competition to its flagship insulin analogue Lantus, and is expected to fall to fourth, down from second position currently. However, there are conscious factors at play, as the company's strategy is increasingly based on developing its portfolio outside of diabetes, across rare blood diseases, speciality care and oncology. Outside of Novo Nordisk's oral semaglutide the value contribution from the other top five anti-diabetic R&D products is minimal.

Worldwide Sales, Market Share & Sales Growth (2017-2024)

Source: Evaluate, May 2018
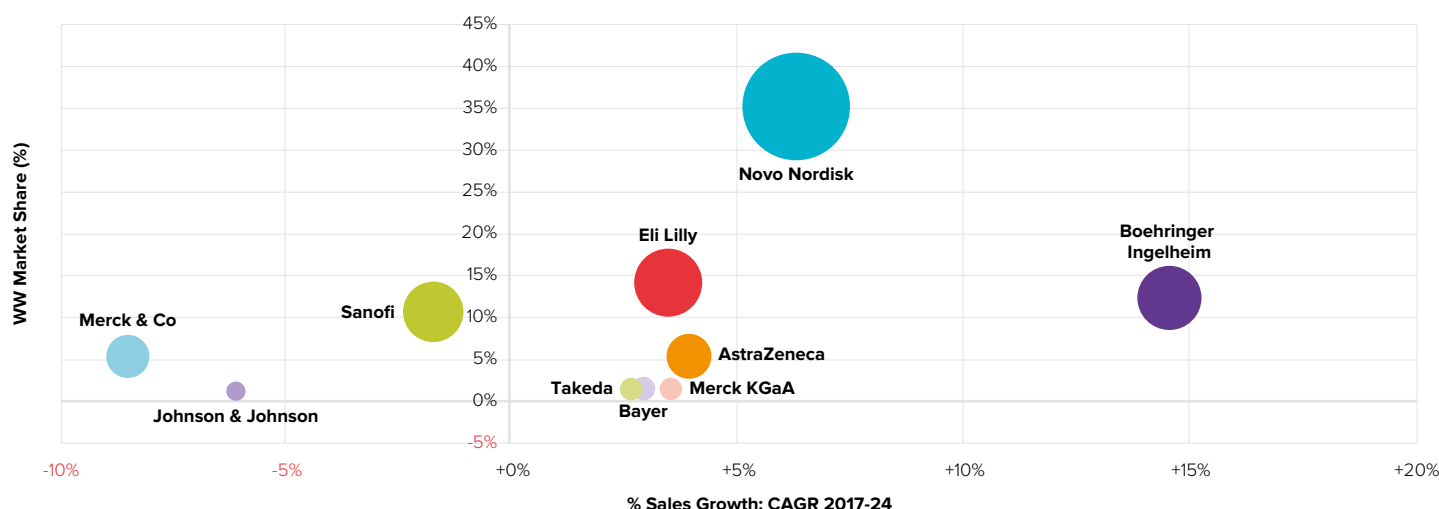
Note: Bubble = WW Sales in 2024

Top 10 Companies & Total Worldwide Anti-Diabetic Sales (2017-2024)

Source: Evaluate, May 2018

Rank	Company	WW Sales ($m)		CAGR 2017-24	WW Market Share		Rank Chg. 2017-24
		2017	2024		2017	2024	
1.	Novo Nordisk	13,689	20,993	+6%	29.7%	35.3%	+0
2.	Eli Lilly	6,663	8,449	+3%	14.4%	14.2%	+1
3.	Boehringer Ingelheim	2,848	7,354	+15%	6.2%	12.4%	+2
4.	Sanofi	7,157	6,347	-2%	15.5%	10.7%	-2
5.	AstraZeneca	2,435	3,186	+4%	5.3%	5.4%	+1
6.	Merck & Co	5,925	3,177	-9%	12.8%	5.3%	-2
7.	Merck KGaA	749	916	+3%	1.6%	1.5%	+2
8.	Takeda	700	890	+3%	1.5%	1.5%	+2
9.	Bayer	654	787	+3%	1.4%	1.3%	+2
10.	Johnson & Johnson	1,111	714	-6%	2.4%	1.2%	-2
	Top 10	41,929	52,813	+3%	90.9%	88.8%	
	Other	4,182	6,651	+7%	9.1%	11.2%	
	Total Industry	46,111	59,464	+4%	100.0%	100.0%	

Top 5 Anti-Diabetic Products Worldwide in 2024

Source: Evaluate, May 2018

| Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m) 2017	WW Sales ($m) 2024	CAGR 2017-24	WW Market Share 2017	WW Market Share 2024	Current Status
1.	Trulicity	dulaglutide	Eli Lilly	Glucagon-like peptide (GLP) 1 agonist	2,030	4,622	+12.5%	4.4%	7.8%	Marketed
2.	Ozempic	semaglutide	Novo Nordisk	Glucagon-like peptide (GLP) 1 agonist	-	4,411	n/a	n/a	7.4%	Marketed
3.	Jardiance	empagliflozin	Boehringer Ingelheim	Sodium glucose co-transporter (SGLT) 2 inhibitor	1,139	3,510	+17.4%	2.5%	5.9%	Marketed
4.	Tresiba	insulin degludec	Novo Nordisk	Insulin analogue	1,113	3,387	+17.2%	2.4%	5.7%	Marketed
5.	NovoRapid	insulin aspart	Novo Nordisk	Insulin analogue	3,043	2,561	-2.4%	6.6%	4.3%	Marketed

Top 5 Anti-Diabetic R&D Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m) 2024	WW Market Share 2024	Current Status
1.	Semaglutide Oral	semaglutide	Novo Nordisk	Glucagon-like peptide (GLP) 1 agonist	1,994	3.4%	Phase III
2.	Sotagliflozin	sotagliflozin	Lexicon Pharmaceuticals + Sanofi	Sodium glucose co-transporter (SGLT) 1/2 inhibitor	753	1.3%	Filed
3.	MPC-300-IV	rexlemestrocel-L	Mesoblast	Mesenchymal cell therapy	227	0.4%	Phase II
4.	ORMD 0801	insulin	Oramed Pharmaceuticals	Insulin	206	0.3%	Phase II
5.	Mirogabalin	mirogabalin	Daiichi Sankyo	Alpha 2 delta ligand	155	0.3%	Filed

Product Segment Contribution to Sales in 2024
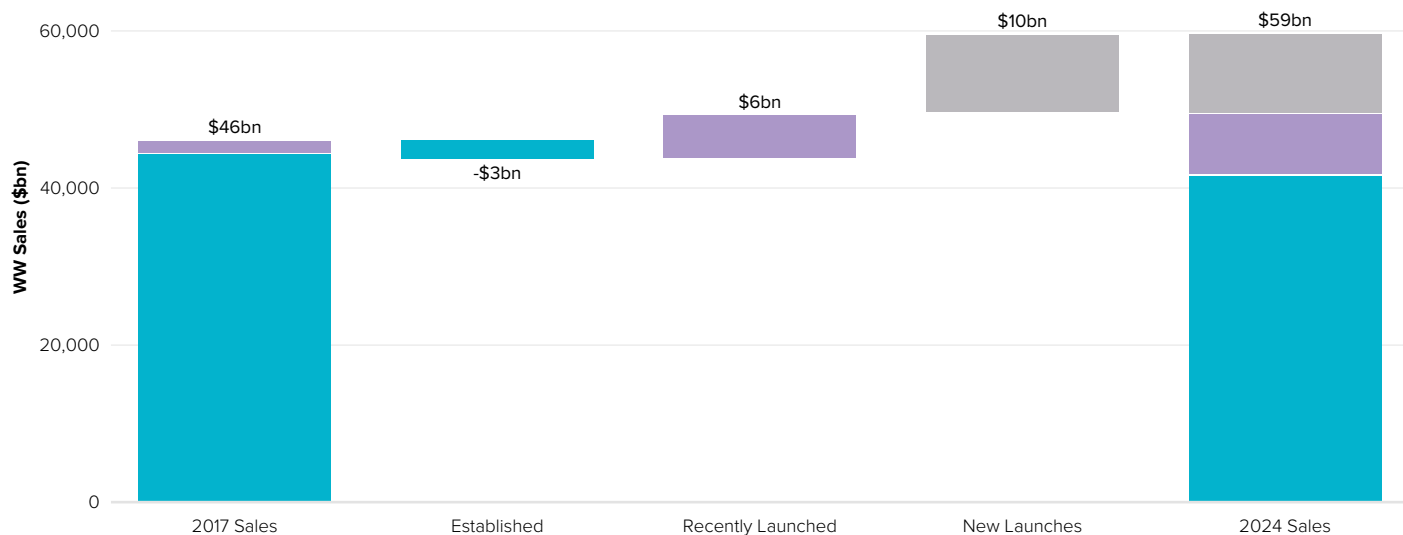
Source: Evaluate, May 2018

Note: Established: Launched prior to 2015 | Recently launched: 2015 to 2017 inclusive | New launches: New launches expected from 2018 | 2017 and 2024 sales reflect the sum of these categories.

Anti-Rheumatics Market to 2024

AbbVie continues to dominate the anti-rheumatics market in 2024; Eli Lilly's Olumiant contributes to the company's +65.3% CAGR.

EvaluatePharma® finds that AbbVie will continue to dominate the anti-rheumatic therapy area, remaining in first position in 2024 with sales of $17.4bn, based on later than previously expected USA biosimilar erosion for Humira and sales expectations for upadacitinib, the company's JAK1 inhibitor which alongside ABBV-599 (BTK/JAK1 inhibitor) and ABBV-3373 (TNF inhibitor antibody-cytotoxic drug conjugate) are expected to be the long-term successors to Humira. Pfizer is forecast to secure second position, like AbbVie relying on sales of its pan-JAK inhibitor, Xeljanz, and TNF inhibitor portfolio which includes Enbrel and biosimilar adalimumab and infliximab.

Johnson & Johnson is anticipated to experience the most negative change over the forecast period as Remicade, uniquely amongst marketed TNF inhibitor therapies, already faces both USA and ROW biosimilar erosion.

The continuing penetration of JAK inhibitors as a therapy of choice is set to change the therapeutic landscape for 2024, where they will account for 24% of the market. It has also allowed for the impressive emergence of entrants into this space. Eli Lilly's marketed JAK1/2 inhibitor, Olumiant, has seen positive updates since launch and is forecast to have sales of $1.5bn by 2024. Gilead's Phase III JAK1 inhibitor, filgotinib, is anticipated to have sales of $1.4bn by 2024. With multiple JAK inhibitors expect the market to resemble that of TNF inhibitors as brands compete to demonstrate a differentiated product profile and secure preferential adoption.

Worldwide Sales, Market Share & Sales Growth (2017-2024)

Source: Evaluate, May 2018
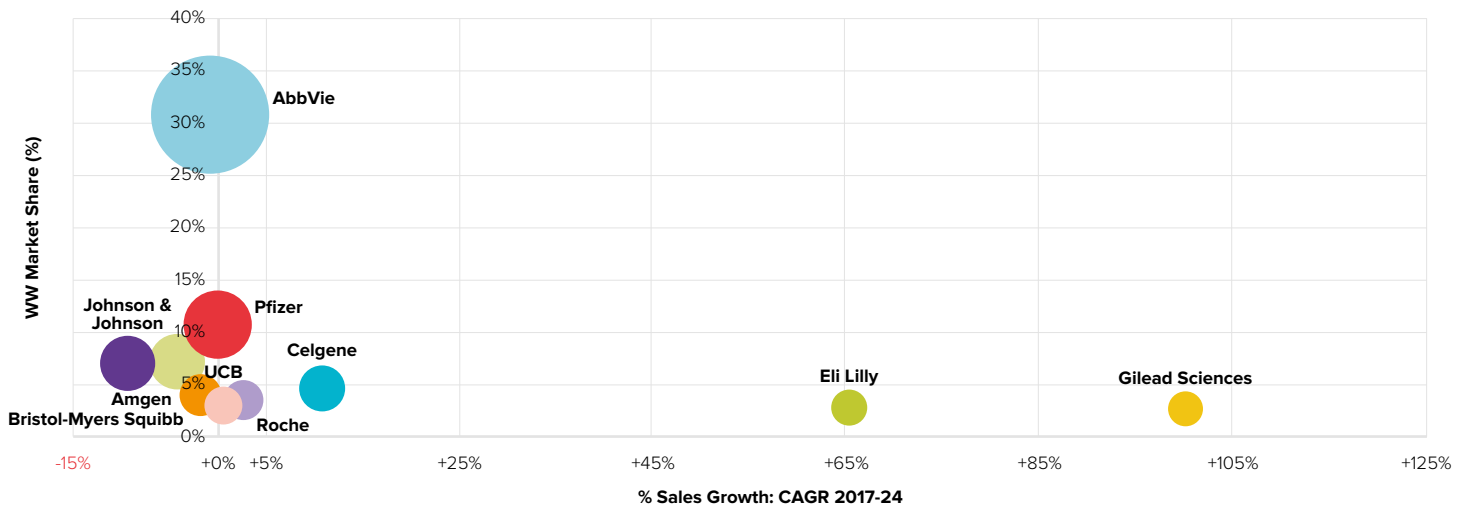
Note: Bubble = WW Sales in 2024

Top 10 Companies & Total Worldwide Anti-Rheumatic Sales 2017-24

Source: Evaluate, May 2018

Rank	Company	WW Sales ($m)		CAGR 2017-24	WW Market Share		Rank Chg. 2017-24
		2017	2024		2017	2024	
1.	**AbbVie**	18,427	**17,406**	-0.8%	33.1%	30.7%	+0
2.	**Pfizer**	6,024	**6,017**	-0.0%	10.8%	10.6%	+1
3.	**Amgen**	5,433	**4,043**	-4.1%	9.7%	7.1%	+1
4.	**Johnson & Johnson**	7,782	**3,907**	-9.4%	14.0%	6.9%	-2
5.	**Celgene**	1,279	**2,621**	+10.8%	2.3%	4.6%	+4
6.	**Bristol-Myers Squibb**	2,479	**2,200**	-1.7%	4.4%	3.9%	-1
7.	**Roche**	1,648	**1,953**	+2.5%	3.0%	3.4%	+0
8.	**UCB**	1,609	**1,678**	+0.6%	2.9%	3.0%	+0
9.	**Eli Lilly**	46	**1,546**	+65.3%	0.1%	2.7%	+29
10.	**Gilead Sciences**	-	**1,418**	n/a	-	2.5%	-
	Top 10	44,727	**42,787**	-0.6%	80.3%	75.5%	
	Other	11,001	**13,911**	+3.4%	19.7%	24.5%	
	Total Industry	**55,728**	**56,699**	+0.2%	100.0%	100.0%	

Top 5 Anti-Rheumatic Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m)		CAGR 2017-24	WW Market Share		Current Status
					2017	2024		2017	2024	
1.	Humira	adalimumab	**AbbVie + Eisai**	Anti-tumour necrosis factor alpha (TNFa) MAb	18,922	**15,233**	-3%	34.0%	26.9%	Marketed
2.	Enbrel	etanercept	**Amgen + Pfizer + Takeda**	Tumour necrosis factor alpha (TNFa) inhibitor	8,241	**4,072**	-10%	14.8%	7.2%	Marketed
3.	Simponi	golimumab	**Johnson & Johnson + Merck & Co**	Anti-tumour necrosis factor alpha (TNFa) MAb	2,652	**2,845**	+1%	4.8%	5.0%	Marketed
4.	Otezla	apremilast	**Celgene**	Phosphodiesterase (PDE) 4 inhibitor	1,279	**2,621**	+11%	2.3%	4.6%	Marketed
5.	Upadacitinib	upadacitinib tartrate	**AbbVie**	Janus kinase (JAK) 1 inhibitor	-	**2,570**	n/a	-	4.5%	R&D

Note: Anti-tumour necrosis factor alpha (TNFa) inhibitor sales include RA, Crohn's and Psoriasis.

## Top 5 R&D Anti-Rheumatic Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m) 2024	WW Market Share 2024	Current Status
1.	Upadacitinib	upadacitinib tartrate	**AbbVie**	Janus kinase (JAK) 1 inhibitor	**2,570**	4.5%	Phase III
2.	Filgotinib	filgotinib	**Gilead Sciences**	Janus kinase (JAK) 1 inhibitor	**1,418**	2.5%	Phase III
3.	ONS-3010	adalimumab	**Oncobiologics**	Anti-tumour necrosis factor alpha (TNFa) MAb	**372**	0.7%	Phase III
4.	Adalimumab	adalimumab	**Mylan**	Anti-tumour necrosis factor alpha (TNFa) MAb	**245**	0.4%	Phase III
5.	ABP 710	infliximab	**Amgen**	Anti-tumour necrosis factor alpha (TNFa) MAb	**198**	0.3%	Phase III

Product Segment Contribution to Sales in 2024
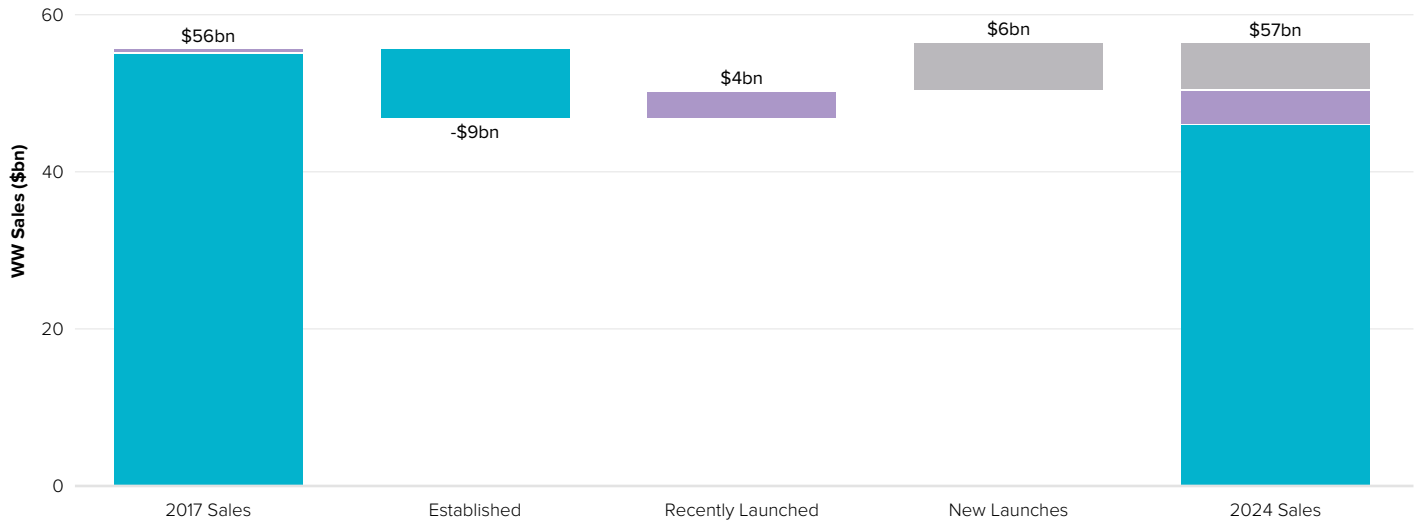
Note: Established: Launched prior to 2015 | Recently launched: 2015 to 2017 inclusive | New launches: New launches expected from 2018 | 2017 and 2024 sales reflect the sum of these categories.

Vaccines Market to 2024

GSK and Merck & Co to remain top 2 throughout 2017-2024.

EvaluatePharma® finds that GSK is expected to lead the vaccines market in 2024 with a market share of 24.1%. This is despite Shingrix, the company's top selling vaccine in 2024, not appearing in the top 5 vaccine products in 2024, reflecting the diverse breadth of GSK's portfolio in this space.

Merck & Co is forecast to take second place with sales of $9.4bn. The company's top selling vaccine, Gardasil, is expected to grow by $0.9bn likely based on continuing positive data showing its efficacy

as a preventative treatment for cancers caused by HPV, higher rates of use and course completion amongst females and males.

Emergent Biosciences is expected to grow 21% owing to its R&D asset, NuThrax, an anthrax vaccine due to launch in 2019. The company already has contracts in place with the USA Biomedical Advanced Research and Development Authority (BARDA) for the use of NuThrax in an emergency response to anthrax exposure. However, Novavax has the highest value R&D vaccine asset with its pre-clinical combination respiratory vaccine, expected to break into the top 5 vaccine products WW by 2024.

Worldwide Sales, Market Share & Sales Growth (2017-2024)

Source: Evaluate, May 2018
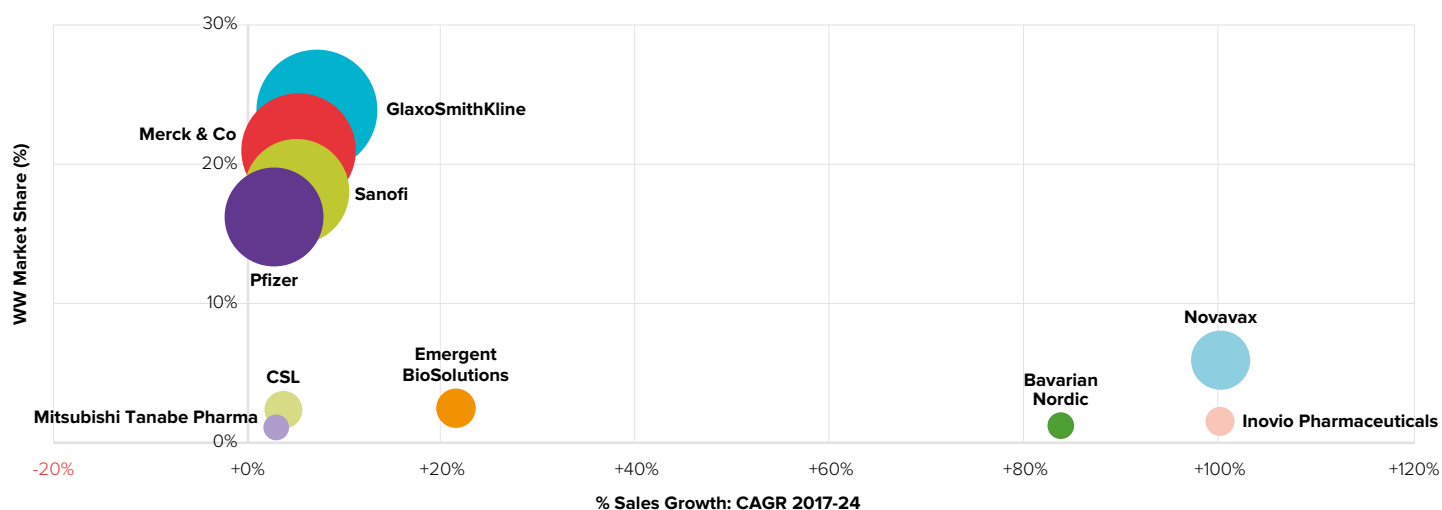
Note: Bubble = WW Sales in 2024

Top 10 Companies & Total Worldwide Vaccine Sales 2017-2024

Source: Evaluate, May 2018

Rank	Company	WW Sales ($m)		CAGR 2017-24	WW Market Share		Rank Chg. 2017-24
		2017	2024		2017	2024	
1.	**GlaxoSmithKline**	6,652	**10,742**	+7%	24.0%	24.1%	+0
2.	**Merck & Co**	6,546	**9,398**	+5%	23.6%	21.1%	+0
3.	**Sanofi**	5,764	**8,130**	+5%	20.8%	18.2%	+1
4.	**Pfizer**	6,001	**7,256**	+3%	21.7%	16.3%	-1
5.	**Novavax**	-	**2,650**	n/a	-	5.9%	n/a
6.	**Emergent BioSolutions**	287	**1,119**	+21%	1.0%	2.5%	+1
7.	**CSL**	835	**1,068**	+4%	3.0%	2.4%	-2
8.	**Inovio Pharmaceuticals**	-	**671**	n/a	-	1.5%	n/a
9.	**Bavarian Nordic**	8	**544**	+84%	0.0%	1.2%	+11
10.	**Mitsubishi Tanabe Pharma**	407	**501**	+3%	1.5%	1.1%	-4
	Top 10	26,500	**42,078**	+7%	95.7%	94.3%	
	Other	1,182	**2,550**	+12%	4.3%	5.7%	
	Total Industry	**27,682**	**44,627**	**+7%**	**100.0%**	**100.0%**	

Top 5 Vaccine Products Worldwide in 2024

Source: Evaluate, May 2018

| Rank	Product	Generic Name	Company	WW Sales ($m) 2017	WW Sales ($m) 2024	CAGR 2017-24	WW Market Share 2017	WW Market Share 2024	Current Status
1.	Prevnar 13	pneumococcal vaccine	**Pfizer + Daewoong Pharmaceutical**	5,693	**5,756**	+0%	20.6%	12.9%	Marketed
2.	Gardasil	human papillomavirus (HPV) vaccine	**Merck & Co + CSL**	2,380	**3,279**	+5%	8.6%	7.3%	Marketed
3.	Pentacel	DTP, Hib & polio vaccine	**Sanofi**	2,065	**2,904**	+5%	7.5%	6.5%	Marketed
4.	Fluzone	influenza vaccine	**Sanofi + Laboratorios Farmacéuticos ROVI**	1,798	**2,406**	+4%	6.5%	5.4%	Marketed
5.	Combination Respiratory Vaccine	influenza vaccine & respiratory syncytial virus (RSV) vaccine	**Novavax**	-	**1,821**		-	4.1%	Pre-clinical

Top 5 Vaccine R&D Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	WW Sales ($m) 2024	WW Market Share 2024	Status
1.	Combination Respiratory Vaccine	influenza vaccine & respiratory syncytial virus (RSV) vaccine	**Novavax**	**1,821**	4.1%	Pre-clinical
2.	NuThrax	anthrax vaccine	**Emergent BioSolutions**	**1,102**	2.5%	Phase III
3.	V114	pneumococcal conjugate vaccine	**Merck & Co**	**774**	1.7%	Phase II
4.	RSV F Vaccine	respiratory syncytial virus (RSV) vaccine	**Novavax**	**668**	1.5%	Phase III
5.	VGX-3100	human papillomavirus (HPV) vaccine	**Inovio Pharmaceuticals**	**622**	1.4%	Phase III

Product Segment Contribution to Sales in 2024
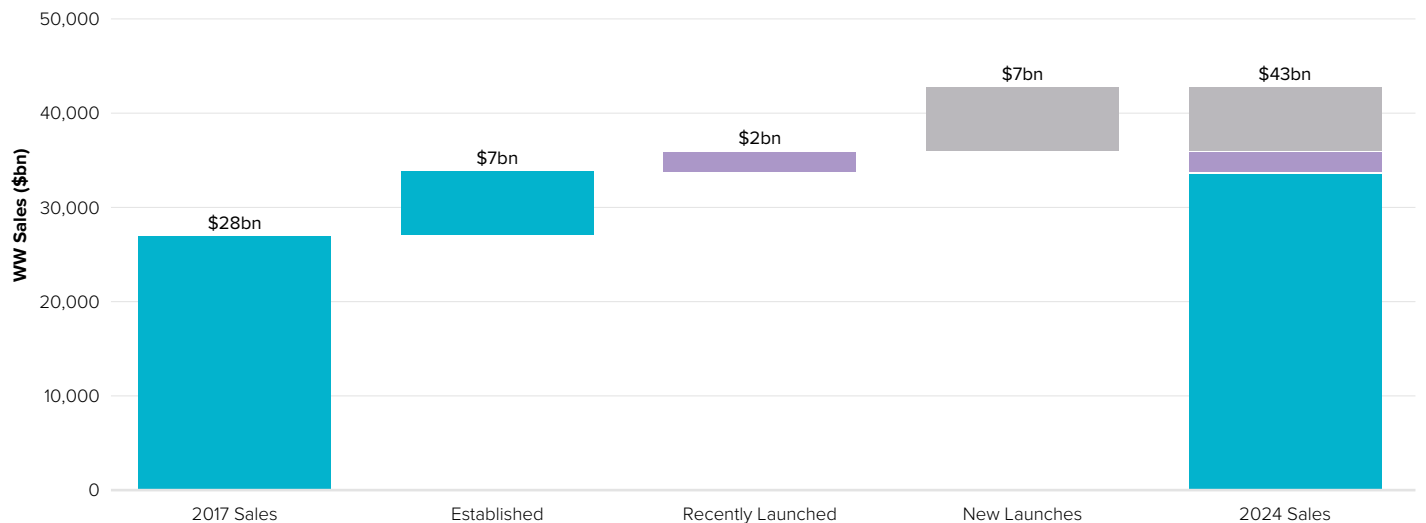
Source: Evaluate, May 2018

Note: Established: Launched prior to 2015 | Recently launched: 2015 to 2017 inclusive | New launches: New launches expected from 2018 | 2017 and 2024 sales reflect the sum of these categories.

Anti-Virals Market to 2024

Gilead declines but holds on to lead position in anti-virals market in 2024.

Gilead's market share in the anti-virals space is set to decline from 55.0% in 2017 to 38.7% in 2024, as sales of its HCV franchise plummet. This decline is due to several factors, a reduction in the addressable HCV market due to cure rates seen with current therapies, pricing constraints with multiple competitors on the market and loss of share to Mavyret which only has an 8-week treatment course. Mavyret is forecasted to have sales of $2.9bn and is responsible for AbbVie's third position amongst the top 10 companies for anti-virals. Gilead however will retain the top spot as its anti-viral portfolio increasingly relies on novel HIV treatments,

with Biktarvy's 2024 sales estimated to be $6.1bn. Although Gilead won't be alone in the HIV space, as GSK is forecast to take second position amongst anti-viral companies in 2024 on the back of its HIV products.

Arbutus Biopharma, created as part of a merger agreement between Tekmira Pharmaceuticals and OnCore Biopharma, enters the top 10 with its hepatitis B product AB-423. Shionogi's Xofluza forecast decreased in 2017 versus 2016, causing Shionogi to drop out of the top 10 allowing Roche to take the 10th place, despite lowered expectations for Roche's anti-virals due to declining Tamiflu and Valcyte sales because of increased generic competition.

Worldwide Sales, Market Share & Sales Growth (2017-2024)

Source: Evaluate, May 2018
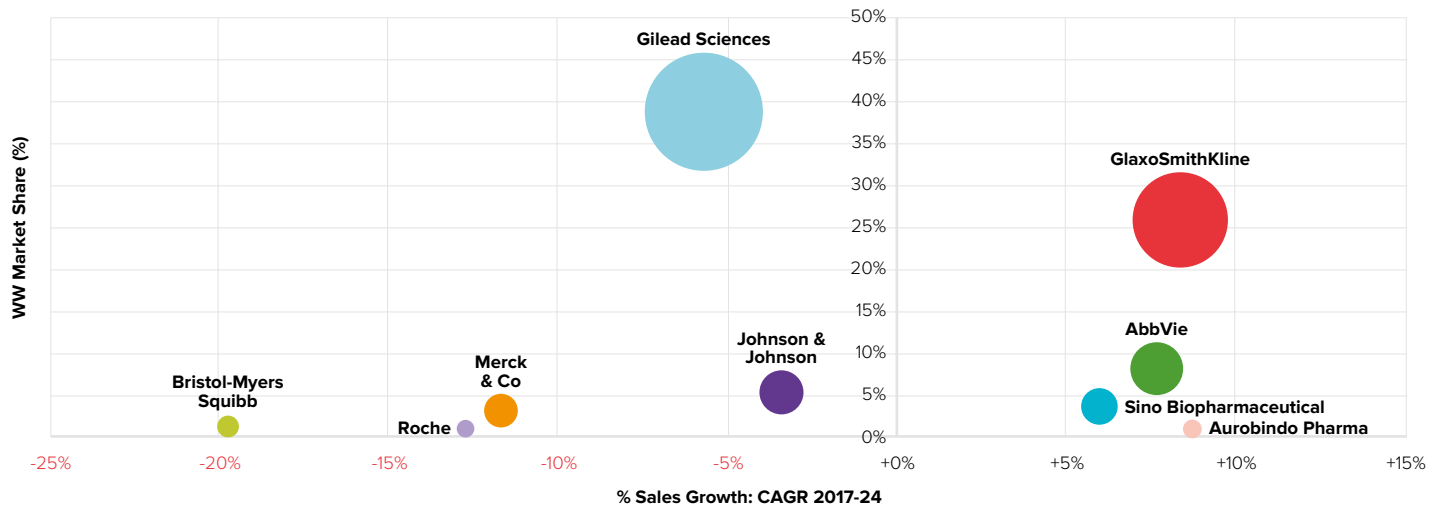
Note: Bubble = WW Sales in 2024

Top 10 Companies & Total Worldwide Anti-viral Sales 2017-24

Source: Evaluate, May 2018

Rank	Company	WW Sales ($m)		CAGR 2017-24	WW Market Share		Rank Chg. 2017-24
		2017	2024		2017	2024	
1.	Gilead Sciences	23,327	15,476	-6%	55.0%	38.7%	+0
2.	GlaxoSmithKline	5,888	10,336	+8%	13.9%	25.9%	+0
3.	AbbVie	1,912	3,203	+8%	4.5%	8.0%	+3
4.	Johnson & Johnson	2,698	2,113	-3%	6.4%	5.3%	+0
5.	Sino Biopharmaceutical	955	1,430	+6%	2.3%	3.6%	+2
6.	Merck & Co	3,002	1,257	-12%	7.1%	3.1%	-3
7.	Bristol-Myers Squibb	2,266	485	-20%	5.3%	1.2%	-2
8.	Aurobindo Pharma	191	342	+9%	0.5%	0.9%	+2
9.	Arbutus Biopharma	-	335	-	-	0.8%	n/a
10.	Roche	843	325	-13%	2.0%	0.8%	-2
	Top 10	41,083	35,303	-2%	96.8%	88.4%	
	Other	1,345	4,642	+19%	3.2%	11.6%	
	Total Industry	42,427	39,945	-1%	100.0%	100.0%	

Top 5 Anti-viral Products Worldwide in 2024

Source: Evaluate, May 2018

| Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m)		CAGR 2017-24	WW Market Share		Current Status
					2017	2024		2017	2024	
1.	Biktarvy	bictegravir sodium; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	-	6,103	n/a	-	15.3%	Marketed
2.	Triumeq	abacavir sulfate; dolutegravir sodium; lamivudine	GlaxoSmithKline	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	3,172	4,731	6%	7.5%	11.8%	Marketed
3.	Genvoya	cobicistat; elvitegravir; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences + Torii Pharmaceutical	Nucleoside reverse transcriptase inhibitor (NRTI), cytochrome P450 (CYP) 3A & HIV integrase inhibitor	3,731	3,402	-1%	8.8%	8.5%	Marketed
4.	Mavyret	glecaprevir; pibrentasvir	AbbVie	Hepatitis C NS3/4A protease & hepatitis C NS5A inhibitor	500	2,871	28%	1.2%	7.2%	Marketed
5.	Tivicay	dolutegravir	GlaxoSmithKline	HIV integrase inhibitor	1,810	2,708	+6%	4.3%	6.8%	Marketed

Top 5 R&D Anti-viral Products Worldwide in 2024

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharma Class	WW Sales ($m) 2024	WW Market Share 2024	Current Status
1.	Inarigivir	inarigivir soproxil	Spring Bank Pharmaceuticals	Retinoic-acid-inducible gene I (RIG-I) & nucleotide-binding oligomerization domain containing 2 (NOD2) activator	1,030	2.6%	Phase II
2.	Dolutegravir & Lamivudine	dolutegravir; lamivudine	GlaxoSmithKline	HIV integrase inhibitor & nucleoside reverse transcriptase inhibitor (NRTI)	907	2.3%	Phase III
3.	ABI-H0731	-	Assembly Biosciences	Core protein allosteric modulator (CpAM)	739	1.9%	Phase I
4.	Cabotegravir & Rilpivirine	cabotegravir sodium; rilpivirine hydrochloride	GlaxoSmithKline	HIV integrase inhibitor & non-nucleoside reverse transcriptase inhibitor (NNRTI)	644	1.6%	Phase III
5.	Fostemsavir Tromethamine	fostemsavir tromethamine	GlaxoSmithKline	Glycoprotein (gp) 120 antagonist	352	0.9%	Phase III

Product Segment Contribution to Sales in 2024
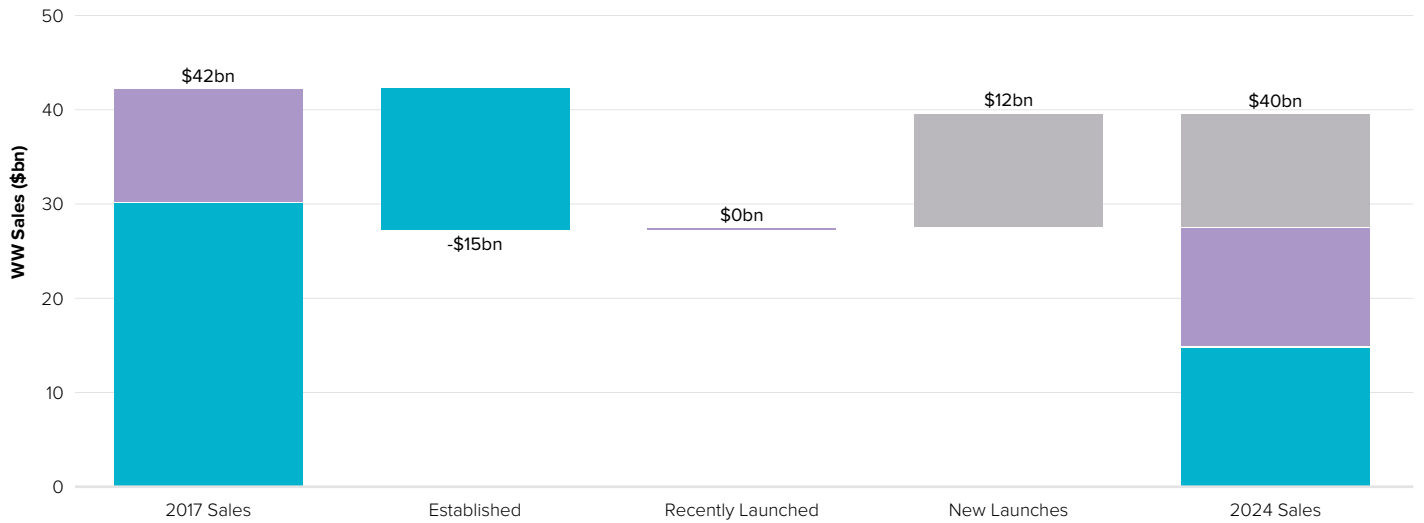
Note: Established: Launched prior to 2015 | Recently launched: 2015 to 2017 inclusive | New launches: New launches expected from 2018 | 2017 and 2024 sales reflect the sum of these categories.

2024: Top 50 Selling Products in the World

Humira to maintain the top rank in 2024; Keytruda overtakes Opdivo.

EvaluatePharma® consensus forecasts show that Humira remained the top selling product worldwide last year with sales $2.5bn higher than 2016. Humira's position as the generally preferred first-line TNF inhibitor in immunology, the chronic nature of its use and deals reached with Amgen and Biogen to delay USA biosimilar erosion until 2023, result in Humira remaining the top selling drug in 2024, despite a CAGR of -3% over the next 7 years. In second place, Keytruda not only leap-frogs Opdivo as the bestselling anti PD-1 in 2024 with a 9% higher CAGR than its competitor, but also overtakes Revlimid by over $750m.

Still inside the top 10, the forecast for Dupixent now places the drug in 8th position in 2024 compared to last year's 2022 consensus forecast which placed the drug 17th place, highlighting clear recognition of the potential of Sanofi's chief growth driver. Dupixent is expected to be approved in asthma later in 2018.

Amongst the 17 new entries to the top 50, Gilead's Biktarvy leads the way ranked 11th in 2024, outperforming all other HIV medications. Three products currently in R&D are forecast to enter the top 50, with Vertex Pharmaceutical's VX-659 + Tezacaftor + Ivacaftor ranked the highest at position 36 with $3,485m revenues forecast in 2024.

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharmacological Class	WW Product Sales ($m)			Market Status
					2017	2024	CAGR	
1.	**Humira**	adalimumab	AbbVie + Eisai	Anti-tumour necrosis factor alpha (TNFa) MAb	18,922	15,233	-3%	Marketed
2.	**Keytruda**	pembrolizumab	Merck & Co + Otsuka Holdings	Anti-programmed cell death-1 (PD-1) MAb	3,823	12,686	+19%	Marketed
3.	**Revlimid**	lenalidomide	Celgene + BeiGene	Immunomodulator	8,191	11,931	+6%	Marketed
4.	**Opdivo**	nivolumab	Bristol-Myers Squibb + Ono Pharmaceutical	Anti-programmed cell death-1 (PD-1) MAb	5,725	11,247	+10%	Marketed
5.	**Eliquis**	apixaban	Bristol-Myers Squibb	Factor Xa inhibitor	4,872	10,535	+12%	Marketed
6.	**Imbruvica**	ibrutinib	AbbVie + Johnson & Johnson	Bruton's tyrosine kinase (BTK) inhibitor	3,196	9,557	+17%	Marketed
7.	**Ibrance**	palbociclib	Pfizer	Cyclin-dependent kinase (CDK) 4 & 6 inhibitor	3,126	8,284	+15%	Marketed
8.	**Dupixent**	dupilumab	Sanofi	Anti-IL-4 & IL-13 MAb	247	8,058	+64%	Marketed
9.	**Eylea**	aflibercept	Regeneron Pharmaceuticals + Bayer + Santen Pharmaceutical	Vascular endothelial growth factor receptor (VEGFr) kinase inhibitor	6,282	6,827	+1%	Marketed
10.	**Stelara**	ustekinumab	Johnson & Johnson	Anti-IL-12 & IL-23 MAb	4,011	6,466	+7%	Marketed
11.	**Biktarvy**	bictegravir sodium; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	-	6,103	n/a	Marketed
12.	**Darzalex**	daratumumab	Johnson & Johnson	Anti-CD38 MAb	1,242	6,033	+25%	Marketed
13.	**Tecentriq**	atezolizumab	Roche	Anti-programmed cell death ligand-1 (PD-L1) MAb	495	6,006	+43%	Marketed
14.	**Prolia/Xgeva**	denosumab	Amgen + Daiichi Sankyo	Anti-receptor activator of nuclear factor-kappaB ligand (RANKL) MAb	3,891	5,995	+6%	Marketed
15.	**Perjeta**	pertuzumab	Roche	Anti-human epidermal growth factor (HER2/ErbB-2) MAb	2,231	5,935	+15%	Marketed
16.	**Xarelto**	rivaroxaban	Johnson & Johnson + Bayer	Factor Xa inhibitor	5,640	5,915	+1%	Marketed
17.	**Ocrevus**	ocrelizumab	Roche	Anti-CD20 MAb	883	5,875	+31%	Marketed
18.	**Prevnar 13**	pneumococcal vaccine	Pfizer + Daewoong Pharmaceutical	Pneumococcal vaccine	5,693	5,756	+0%	Marketed
19.	**Cosentyx**	secukinumab	Novartis	Anti-IL-17 MAb	2,071	5,500	+15%	Marketed
20.	**Soliris**	eculizumab	Alexion Pharmaceuticals	Anti-complement factor C5 MAb	3,144	5,208	+7%	Marketed
21.	**Triumeq**	abacavir sulfate; dolutegravir sodium; lamivudine	GlaxoSmithKline	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	3,172	4,731	+6%	Marketed
22.	**Trulicity**	dulaglutide	Eli Lilly	Glucagon-like peptide (GLP) 1 agonist	2,030	4,622	+12%	Marketed
23.	**Botox**	onabotulinumtoxinA	Allergan	Neuromuscular blocker	3,169	4,573	+5%	Marketed

Rank	Product	Generic Name	Company	Pharmacological Class	WW Product Sales ($m)			Market Status
					2017	2024	CAGR	
24.	**Xtandi**	enzalutamide	Astellas Pharma	Androgen receptor antagonist	2,656	4,500	+8%	Marketed
25.	**Hemlibra**	emicizumab	Roche + Chugai Pharmaceutical	Anti-factor IXa & X bispecific MAb	3	4,442	+183%	Marketed
26.	**Entresto**	sacubitril; valsartan	Novartis	Angiotensin II receptor (AT1) antagonist & neprilysin inhibitor (ARNI)	507	4,426	+36%	Marketed
27.	**Ozempic**	semaglutide	Novo Nordisk	Glucagon-like peptide (GLP) 1 agonist	-	4,411	n/a	Marketed
28.	**Enbrel**	etanercept	Amgen + Pfizer + Takeda	Tumour necrosis factor alpha (TNFa) inhibitor	8,241	4,072	-10%	Marketed
29.	**Repatha**	evolocumab	Amgen + Astellas Pharma	Anti-proprotein convertase subtilisin kexin (PCSK) type 9 MAb	333	4,060	+43%	Marketed
30.	**Entyvio**	vedolizumab	Takeda	Anti-alpha 4 beta 7 integrin MAb	1,800	4,057	+12%	Marketed
31.	**Jakafi**	ruxolitinib phosphate	Incyte + Novartis	Janus kinase (JAK) 1 & 2 inhibitor	1,910	3,908	+11%	Marketed
32.	**Tagrisso**	osimertinib mesylate	AstraZeneca	Epidermal growth factor receptor (EGFR) tyrosine kinase inhibitor	955	3,904	+22%	Marketed
33.	**Imfinzi**	durvalumab	AstraZeneca + Celgene	Anti-programmed cell death ligand-1 (PD-L1) MAb	19	3,653	+112%	Marketed
34.	**Jardiance**	empagliflozin	Boehringer Ingelheim	Sodium glucose co-transporter (SGLT) 2 inhibitor	1,139	3,510	+17%	Marketed
35.	**Tremfya**	guselkumab	Johnson & Johnson	Anti-IL-23 MAb	42	3,486	+88%	Marketed
36.	**VX-659 + Teza-caftor + Ivacaftor**	-	Vertex Pharmaceuticals	Cystic fibrosis transmembrane regulator (CFTR) potentiator & corrector	-	3,485	n/a	R&D
37.	**Genvoya**	cobicistat; elvitegravir; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences + Torii Pharmaceutical	Nucleoside reverse transcriptase inhibitor (NRTI), cytochrome P450 (CYP) 3A & HIV integrase inhibitor	3,731	3,402	-1%	Marketed
38.	**Tresiba**	insulin degludec	Novo Nordisk	Insulin analogue	1,113	3,387	+17%	Marketed
39.	**Gardasil**	human papillomavirus (HPV) vaccine	Merck & Co + CSL	Human papillomavirus (HPV) vaccine	2,380	3,279	+5%	Marketed
40.	**Gammagard Liquid**	immune globulin (human)	Shire	Immunoglobulin	2,106	3,228	+6%	Marketed
41.	**Aducanumab**	aducanumab	Biogen + Eisai	Anti-beta-amyloid (Abeta) MAb	-	3,215	n/a	R&D
42.	**Tecfidera**	dimethyl fumarate	Biogen	Fumarate	4,214	3,020	-5%	Marketed
43.	**Pentacel**	DTP, Hib & polio vaccine	Sanofi	DPT, Hib & polio vaccine	2,065	2,904	+5%	Marketed
44.	**Mavyret**	glecaprevir; pibrentasvir	AbbVie	Hepatitis C NS3/4A protease & hepatitis C NS5A inhibitor	500	2,871	+28%	Marketed
45.	**Elafibranor**	elafibranor	Genfit + Undisclosed Licensing Partner	Peroxisome proliferator activated receptor (PPAR) alpha & delta agonist	-	2,871	n/a	R&D
46.	**Simponi**	golimumab	Johnson & Johnson + Merck & Co	Anti-tumour necrosis factor alpha (TNFa) MAb	2,652	2,845	+1%	Marketed
47.	**Avastin**	bevacizumab	Roche	Anti-vascular endothelial growth factor receptor (VEGFr) MAb	6,795	2,767	-12%	Marketed
48.	**Venclexta**	venetoclax	AbbVie + Roche	B-cell lymphoma (Bcl) 2 inhibitor	137	2,766	+54%	Marketed
49.	**Tivicay**	dolutegravir	GlaxoSmithKline	HIV integrase inhibitor	1,810	2,708	+6%	Marketed
50.	**Taltz**	ixekizumab	Eli Lilly	Anti-IL-17 MAb	559	2,707	+25%	Marketed
	Total				**137,726**	**266,960**	**+10%**	
	Total WW Individual Products Forecast in EvaluatePharma®				**635,182**	**987,974**	**+7%**	

Note: Sales represent company reported sales where available, otherwise based on an average of equity analyst estimates.

2024: Top 50 Selling Products in the USA

Humira continues to lead the pack in 2024.

EvaluatePharma® forecasts that AbbVie's Humira will continue to be the leading product in the USA in 2024. Humira's position as the generally preferred first-line TNF inhibitor in immunology, the chronic nature of its use and deals reached with Amgen and Biogen to delay USA biosimilar erosion until 2023 support its forecast. Furthermore, in the USA unlike the ROW, no biosimilar etanercept will be available limiting the risk of cross-brand biosimilar erosion to biosimilar infliximab.

Celgene's Revlimid is predicted to be in second place despite coming off patent in 2022, with sales growing an average 9% per year to reach $10.2bn in 2024.

In the anti-PD-1 space, Bristol-Myers Squibb's Opdivo is predicted to perform strongly in 2024 but will lag behind Merck's third-placed Keytruda which has been approved in first-line locally advanced or metastatic NSCLC, while Opdivo has not. Roche's Tecentriq is also forecast to perform strongly with its extensive program of Phase III trials across multiple cancers.

Johnson & Johnson's portfolio is looking strong with four products forecast to be in the top 25 in 2024, led by Stelara.

Vertex Pharmaceutical's VX-659 + Tezacaftor + Ivacaftor triple combination regiment for cystic fibrosis is forecast to be the highest grossing R&D product.

Source: Evaluate, May 2018

Rank	Product	Generic Name	Company	Pharmacological Class	USA Product Sales ($m) 2017	2024	CAGR	US Market Status
1.	**Humira**	adalimumab	AbbVie	Anti-tumour necrosis factor alpha (TNFa) MAb	12,361	12,201	-0%	Marketed
2.	**Revlimid**	lenalidomide	Celgene	Immunomodulator	5,426	10,151	+9%	Marketed
3.	**Keytruda**	pembrolizumab	Merck & Co	Anti-programmed cell death-1 (PD-1) MAb	2,309	6,821	+17%	Marketed
4.	**Eliquis**	apixaban	Bristol-Myers Squibb	Factor Xa inhibitor	2,887	5,823	+11%	Marketed
5.	**Imbruvica**	ibrutinib	AbbVie	Bruton's tyrosine kinase (BTK) inhibitor	2,144	5,482	+14%	Marketed
6.	**Dupixent**	dupilumab	Sanofi	Anti-IL-4 & IL-13 MAb	244	5,370	+56%	Marketed
7.	**Ibrance**	palbociclib	Pfizer	Cyclin-dependent kinase (CDK) 4 & 6 inhibitor	2,825	5,291	+9%	Marketed
8.	**Opdivo**	nivolumab	Bristol-Myers Squibb	Anti-programmed cell death-1 (PD-1) MAb	3,102	5,265	+8%	Marketed
9.	**Ocrevus**	ocrelizumab	Roche	Anti-CD20 MAb	874	4,453	+26%	Marketed
10.	**Stelara**	ustekinumab	Johnson & Johnson	Anti-IL-12 & IL-23 MAb	2,767	4,405	+7%	Marketed
11.	**Biktarvy**	bictegravir sodium; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	-	4,312	n/a	Marketed
12.	**Xarelto**	rivaroxaban	Johnson & Johnson	Factor Xa inhibitor	2,500	4,302	+8%	Marketed
13.	**Eylea**	aflibercept	Regeneron Pharmaceuticals	Vascular endothelial growth factor receptor (VEGFr) kinase inhibitor	3,702	4,194	+2%	Marketed
14.	**Tecentriq**	atezolizumab	Roche	Anti-programmed cell death ligand-1 (PD-L1) MAb	463	4,099	+37%	Marketed
15.	**Prolia/Xgeva**	denosumab	Amgen	Anti-receptor activator of nuclear factor-kappaB ligand (RANKL) MAb	2,429	3,967	+7%	Marketed
16.	**Darzalex**	daratumumab	Johnson & Johnson	Anti-CD38 MAb	884	3,822	+23%	Marketed
17.	**Trulicity**	dulaglutide	Eli Lilly	Glucagon-like peptide (GLP) 1 agonist	1,610	3,308	+11%	Marketed
18.	**Cosentyx**	secukinumab	Novartis	Anti-IL-17 MAb	1,275	3,233	+14%	Marketed
19.	**Botox**	onabotulinumtoxinA	Allergan	Neuromuscular blocker	2,254	3,189	+5%	Marketed
20.	**Perjeta**	pertuzumab	Roche	Anti-human epidermal growth factor (HER2/ErbB-2) MAb	1,029	3,149	+17%	Marketed
21.	**Prevnar 13**	pneumococcal vaccine	Pfizer	Pneumococcal vaccine	3,334	3,093	-1%	Marketed
22.	**Enbrel**	etanercept	Amgen	Tumour necrosis factor alpha (TNFa) inhibitor	5,206	2,930	-8%	Marketed
23.	**Ozempic**	semaglutide	Novo Nordisk	Glucagon-like peptide (GLP) 1 agonist	-	2,909	n/a	Marketed

Rank	Product	Generic Name	Company	Pharmacological Class	USA Product Sales ($m)			US Market Status
					2017	2024	CAGR	
24.	**Triumeq**	abacavir sulfate; dolutegravir sodium; lamivudine	GlaxoSmithKline	Nucleoside reverse transcriptase inhibitor (NRTI) & HIV integrase inhibitor	2,104	2,871	+5%	Marketed
25.	**Tremfya**	guselkumab	Johnson & Johnson	Anti-IL-23 MAb	39	2,727	+84%	Marketed
26.	**Repatha**	evolocumab	Amgen	Anti-proprotein convertase subtilisin kexin (PCSK) type 9 MAb	225	2,571	+42%	Marketed
27.	**Jakafi**	ruxolitinib phosphate	Incyte	Janus kinase (JAK) 1 & 2 inhibitor	1,133	2,545	+12%	Marketed
28.	**Entresto**	sacubitril; valsartan	Novartis	Angiotensin II receptor (AT1) antagonist & neprilysin inhibitor (ARNI)	297	2,541	+36%	Marketed
29.	**Gammagard Liquid**	immune globulin (human)	Shire	Immunoglobulin	1,622	2,506	+6%	Marketed
30.	**Soliris**	eculizumab	Alexion Pharmaceuticals	Anti-complement factor C5 MAb	1,235	2,457	+10%	Marketed
31.	**Xtandi**	enzalutamide	Astellas Pharma	Androgen receptor antagonist	1,303	2,292	+8%	Marketed
32.	**Entyvio**	vedolizumab	Takeda	Anti-alpha 4 beta 7 integrin MAb	1,236	2,278	+9%	Marketed
33.	**Jardiance**	empagliflozin	Boehringer Ingelheim	Sodium glucose co-transporter (SGLT) 2 inhibitor	776	2,238	+16%	Marketed
34.	**Genvoya**	cobicistat; elvitegravir; emtricitabine; tenofovir alafenamide fumarate	Gilead Sciences	Nucleoside reverse transcriptase inhibitor (NRTI), cytochrome P450 (CYP) 3A & HIV integrase inhibitor	3,033	2,234	-4%	Marketed
35.	**Tecfidera**	dimethyl fumarate	Biogen	Fumarate	3,294	2,229	-5%	Marketed
36.	**VX-659 + Teza-caftor + Ivacaftor**	-	Vertex Pharmaceuticals	Cystic fibrosis transmembrane regulator (CFTR) potentiator & corrector	-	2,201	n/a	R&D
37.	**Tresiba**	insulin degludec	Novo Nordisk	Insulin analogue	755	2,181	+16%	Marketed
38.	**Imfinzi**	durvalumab	AstraZeneca + Celgene	Anti-programmed cell death ligand-1 (PD-L1) MAb	19	2,072	+95%	Marketed
39.	**Hemlibra**	emicizumab	Roche	Anti-factor IXa & X bispecific MAb	3	2,042	+153%	Marketed
40.	**Venclexta**	venetoclax	AbbVie + Roche	B-cell lymphoma (Bcl) 2 inhibitor	110	1,997	+51%	Marketed
41.	**Gardasil**	human papillomavirus (HPV) vaccine	Merck & Co	Human papillomavirus (HPV) vaccine	1,565	1,995	+4%	Marketed
42.	**Cabometyx**	cabozantinib (S)-malate	Exelixis	AXL tyrosine kinase (AXL), mesenchymal epithelial transition (c-Met), RET proto oncogene & vascular endothelial growth factor receptor (VEGFr) inhibitor	323	1,958	+29%	Marketed
43.	**Vyvanse**	lisdexamfetamine dimesylate	Shire	Dopamine agonist & norepinephrine reuptake inhibitor (SNRI)	1,917	1,945	+0%	Marketed
44.	**Upadacitinib**	upadacitinib tartrate	AbbVie	Janus kinase (JAK) 1 inhibitor	-	1,871	n/a	R&D
45.	**MultiStem**	-	Athersys	Anti-tumour necrosis factor (TNF) cell therapy	-	1,835	n/a	R&D
46.	**Xolair**	omalizumab	Roche	Anti-IgE MAb	1,770	1,809	+0%	Marketed
47.	**Otezla**	apremilast	Celgene	Phosphodiesterase (PDE) 4 inhibitor	1,058	1,798	+8%	Marketed
48.	**Mavyret**	glecaprevir; pibrentasvir	AbbVie	Hepatitis C NS3/4A protease & hepatitis C NS5A inhibitor	315	1,779	+28%	Marketed
49.	**Epidiolex**	cannabidiol	GW Pharmaceuticals	Cannabinoid	-	1,773	n/a	R&D
50.	**AR101**	-	Aimmune Therapeutics	Immunomodulator	-	1,747	n/a	R&D
	Total				**83,757**	**170,260**	**+11%**	
	Total USA Individual Products Forecast in EvaluatePharma®				**318,565**	**538,083**	**+8%**	

Note: Sales represent company reported sales where available, otherwise based on an average of equity analyst estimates.

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