PwC Deals

Drive your growth. Secure your future.

Global Pharma & Life Sciences Deals Insights
Year-end 2018

Executive summary

Despite a strong desire for companies to be active in M&A and continued acquisition and divestiture evaluation, many buyers were kept from executing on their inorganic growth agendas due to inflated valuations (related to bid/ask differences), leadership changes (allowing time for new strategy to be actioned), and political and regulatory uncertainty (impacting drug pricing and the broader healthcare landscape). While the total deal value was higher in 2018 (primarily driven by the Takeda/Shire $81.7B megadeal), lower volumes reflect the challenges faced in completing deals.

"We expect 2019 to be a robust year for M&A in our sector as the underlying fundamentals have never been better. The recent BMS & Celgene combination demonstrates that we are off to a strong start. Companies need to grow inorganically and they have access to capital, capital markets / biotech prices have begun to normalize, management changes have stabilized, and companies are ready to reshuffle their portfolios in order to transform. We expect to see acquisitions and divestments of non-core assets to be the result."

— Glenn Hunzinger, US PLS Deals Leader, PwC

Year-end 2018	vs. year-end 2017
Value by the numbers $221.3B	22% Increase in deal value vs. year-end 2017
Volume by the numbers 248	-9% Decrease in deal volume vs. year-end 2017

Sub-sectors
(see page 3 for 2018 and page 5 for 2019 outlook)

	2018	2019
Pharmaceutical	↗	↗
Biotechnology	→	↑
Medical Devices	↓	↗
Other/Services	↓	→

High level trends and highlights 2018 and 2019 (see page 3 for 2018 and page 5 for 2019 outlook)

- **Pharma** was up in 2018, driven primarily by the Takeda / Shire deal. Excluding this deal, Pharmaceuticals value and volumes were still higher year-over-year. We expect significant activity in 2019 driven mainly by acquisitions, partnerships/JVs and divestitures.
- **Biotechnology** has experienced some normalization of capital market valuations, and the recent Tesaro acquisition by GSK is an example of what we expect to see in 2019.
- **Medical Devices** was down relative to 2017 due to a lack of megadeals (none in 2018). However, we expect 2019 to increase in both values and volumes.
- **Other** was down as the prior year included many large CRO deals. Activity in 2019 will likely increase from smaller bolt-on acquisitions and at least one larger deal driven by horizontal consolidation. *Note that the above amount excludes the OTC JV between GSK and Pfizer.*

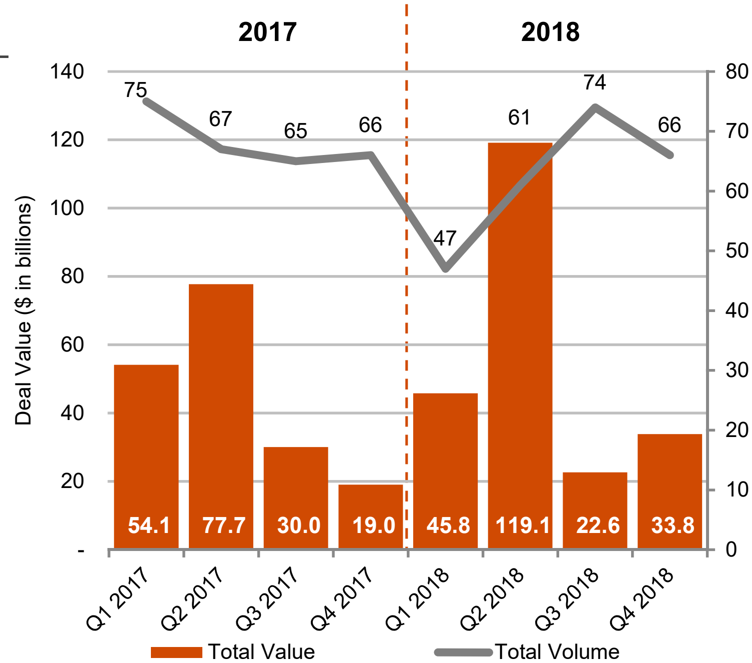
*Data provided by Capital IQ, as of December 31, 2018. Includes Transactions (excludes JV)

pwc

Highlights of 2018 deal activity

Deal value and volume overview

- The Pharma and Life Sciences (PLS) industry has been volatile over the past two years, likely impacted by major events such as leadership changes at major companies, tax reform and mid-term elections.
- The PLS sector has seen eight megadeals in the 2018 fiscal year, matching the number of megadeals that were announced in the 2017 fiscal year.
- In Q4 2018 deal volume declined after two quarters of increases. Deal value continues to fluctuate depending on the presence of megadeals.
- While the deal volume of Q4 2018 decreased, it remained similar to the levels exhibited through much of 2017.



Largest transaction

The largest announced transaction of the year was Takeda's acquisition of Shire. The Japanese pharma giant agreed to purchase Shire for approximately $81.7B, which is $70.2B larger than the second largest deal of the year.

$81.7B

Megadeals ($5B and over)

2018 saw eight megadeals over the course of the year, with two pharma deals and six biotech deals making up the largest deals of the year.

8 mega deals*

2018 PLS megadeals *

Announced	Target name	Target nation	Acquirer name	Acquirer nation	Value ($MM)	Segment
4/19/2018	**Shire plc**	*Channel Islands*	**Takeda Pharmaceutical**	*Japan*	**81,667**	*Pharma*
1/22/2018	**Bioverativ Inc.**	*United States*	**Sanofi**	*France*	**11,474**	*Biotech*
1/22/2018	**Juno Therapeutics, Inc.**	*United States*	**Celgene Corporation**	*United States*	**9,305**	*Biotech*
4/9/2018	**AveXis, Inc.**	*United States*	**Novartis AG**	*Switzerland*	**8,696**	*Biotech*
1/7/2018	**Impact Biomedicines, Inc.**	*United States*	**Celgene Corporation**	*United States*	**7,000**	*Biotech*
1/29/2018	**Ablynx NV**	*Belgium*	**Sanofi**	*France*	**5,492**	*Biotech*
12/3/2018	**Tesaro, Inc.**	*United States*	**GlaxoSmithKline plc**	*United Kingdom*	**5,468**	*Biotech*
12/3/2018	**GSK Bangladesh Ltd./GSK CH Ltd.**	*Bangladesh*	**Unilever PLC; Hindustan Unilever Limited**	*United Kingdom*	**5,323**	*Pharma*

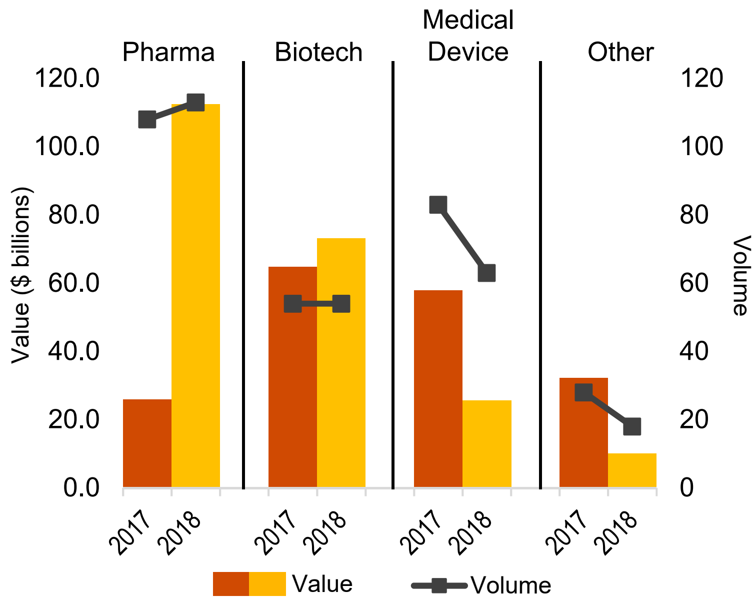
* Excludes the announced OTC JV between GSK and Pfizer.

Sub-sector deal trends for 2018

Announced deal volume and value by sub-sector

- Both Pharma and Biotech had a similar number of deals in 2017 and 2018, with higher deal values this year in both sub-sectors.
- Medical Devices experienced declines in both deal volume and value during 2018 likely driven by companies trying to determine the appropriate response to the ever changing health services (payor and provider) landscape. Some of the focus previously directed toward M&A within the sub-sector has been redirected towards partnerships and other alternative structures, as demonstrated by the increased number of alliances with hospitals.
- The Other/Services sub-sector experienced a significant decrease in deal value. After a year highlighted by multiple megadeals in 2017, the sub-sector saw less transformative deals and more bolt-on acquisitions in 2018.

Deal value and volumes by sub-sector



Sub-sector highlights

Big Pharma once again kept its leading position, bringing in the highest deal volume and value of any sub-sector due primarily to the Takeda/Shire $81.7B deal. Excluding this deal, the values and volumes were still higher. While private equity buyers continue to play an active role at the negotiating table, strategics have been more willing to close the bid/ask gaps and finalize deals within the sub-sector. Cross-border activity was also strong in Q4 2018, with both inbound and outbound deals within the sub-sector included in the top deals of the quarter.

Despite having the largest deal of the quarter (GSK's acquisition of Tesaro for $5.4B), **Biotech** deal value and volume declined for the third consecutive quarter. As speed to market continues to play a critical role in the success of the sub-sector, we expect strategic acquirers to focus on building digital tools and capabilities to accelerate R&D processes. As industry participants assess the impact of changes in the US Congress, the possibility for further consolidation among larger Biotechs remains.

After two significant deals in Q3 2018, the **Medical Devices** sub-sector only had one of the top 10 deals during Q4 2018 (Colfax's acquisition of DJO Global). As the sub-sector remains an attractive, profitable opportunity for a variety of new entrants and private equity buyers, the need to make platform acquisitions to establish a footprint in the sub-sector could drive future deal activity. Recent divestitures continue to suggest that large industry participants will look to rebalance their portfolios as they innovate and shed mature assets.

Specialty Pharma continued the trend of small acquisitions this quarter. Given the continued regulatory uncertainty and pressures on drug pricing, companies in the sub-sector appear to be hesitant to commit significant capital for transformative acquisitions, yet have focused on early-stage assets with significant potential.

The **Generics** sub-sector experienced limited activity during Q4 2018, likely driven by similar trends as those impacting previous quarters, including drug pricing pressure and import tariffs. Activity in the sector could remain lower than historical levels until greater certainty is achieved around these key drivers for the industry and buyers return to the M&A market in the sub-sector.

Within the **Other/Services** sub-sector (CRO, CMO, etc.), Illumina's acquisition of Pacific Bioscience for approximately $1.3B highlighted the quarter. An increase in demand for targets in other sub-sectors could drive greater opportunity for the Other/Services sub-sector, as new entrants could require greater support from CROs and CMOs. The sub-sector could also see greater activity going forward as participants look to acquire stronger digital and analytical skills to improve efficiency and R&D outcomes.

Animal Health, which benefits from lower regulatory hurdles and pricing pressure compared to other parts of the PLS sector, could benefit from greater private equity interest following Bayer's decision to divest its animal health assets. Merck's acquisition of Antelliq demonstrated Animal Health companies' continued strategy to diversify the business.

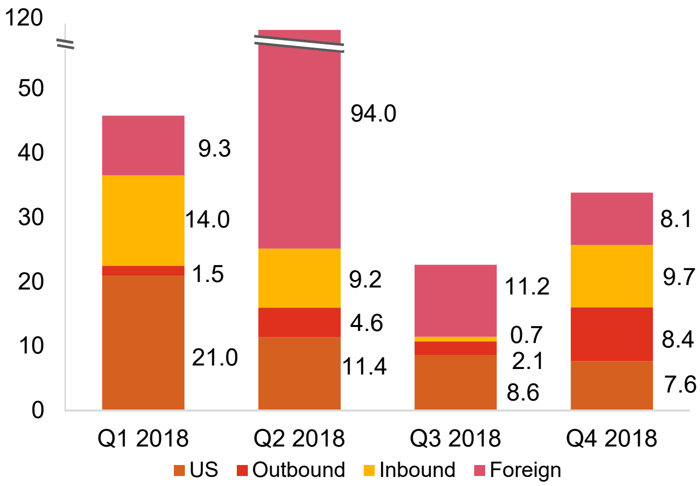
Q4 deal trends in 2018

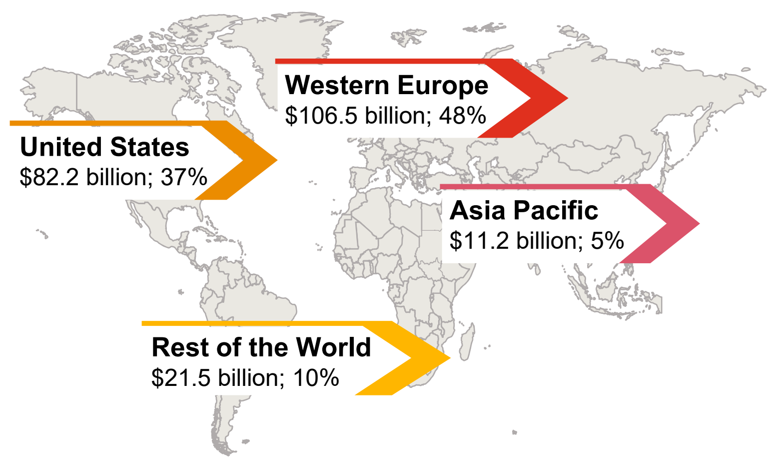
Top 10 deals for Q4 2018

Announced	Target name	Target nation	Acquirer name	Acquirer nation	Value ($MM)	Segment
12/3/2018	**Tesaro, Inc.**	*United States*	**GlaxoSmithKline plc**	*United Kingdom*	**5,468**	*Biotech*
12/3/2018	**GSK Bangladesh Ltd./GSK CH Ltd.**	*Bangladesh*	**Unilever PLC; Hindustan Unilever Limited**	*United Kingdom*	**5,323**	*Pharma*
11/20/2018	**BTG plc**	*United Kingdom*	**Boston Scientific Corporation**	*United States*	**4,221**	*Medical Devices*
12/14/2018	**Antelliq**	*France*	**Merck Animal Health**	*United States*	**3,671**	*Other*
11/19/2018	**DJO Global Inc.**	*United States*	**Colfax Corporation**	*United States*	**3,150**	*Medical Devices*
10/18/2018	**Endocyte, Inc.**	*United States*	**Novartis AG**	*Switzerland*	**2,102**	*Pharma*
11/1/2018	**Pacific Biosciences of California, Inc.**	*United States*	**Illumina, Inc.**	*United States*	**1,281**	*Other*
10/29/2018	**Karo Pharma AB**	*Sweden*	**EQT Partners AB**	*Netherlands*	**1,006**	*Biotech*
10/11/2018	**PharmaCann, LLC**	*United States*	**MedMen Enterprises Inc.**	*Canada*	**682**	*Pharma*
10/11/2018	**Corium International, Inc.**	*United States*	**Gurnet Point Capital Limited**	*United States*	**575**	*Pharma*

Geographic analysis for 2018

Cross border deals by value





Cross border insights

- Foreign transactions made up the majority of deal value for 2018, driven mainly by Takeda's acquisition of Shire in Q2. However, foreign deals saw its smallest quarterly deal value of the year in Q4.
- Across 2018, US deals accounted for the second largest share of deal value, adding up to $48.6B despite declines in US deal value throughout the year.
- With the exception of Q3, the value of inbound deals remained steady throughout the year, while outbound deals had the lowest share with only 7% of deal value in 2018.

Deals by target geography

- Western Europe was the dominant deal value target region for 2018, despite having the lowest volume of deals at 38.
- The United States had the highest number of deal targets at 118 deals, and the second highest deal value at $82.2B.
- Asia Pacific had 41 deal targets for 2018, with a total value of $11.2B. However, this made up only 5% of the total target value of all regions for the year.
- The Rest of the World made up 10% of deal target value, with 51 deal targets for the year.

Pharma and Life Sciences – 2019 Outlook

We expect 2019 to be an active year for deals in the PLS sector. The recently announced $74B combination of BMS and Celgene sets us off in the right direction for this year. Overall, we see other deals to potentially follow given that the underlying fundamentals remain strong and companies are now executing on their forward looking strategies driven by a need for scale and category leadership. We expect the following key contributing factors to drive an active M&A market in 2019: access to capital (currently on balance sheets as well as available financing); capital markets normalizing for biotech companies after a year of robust valuations; and a need for companies to act on their growth strategies.

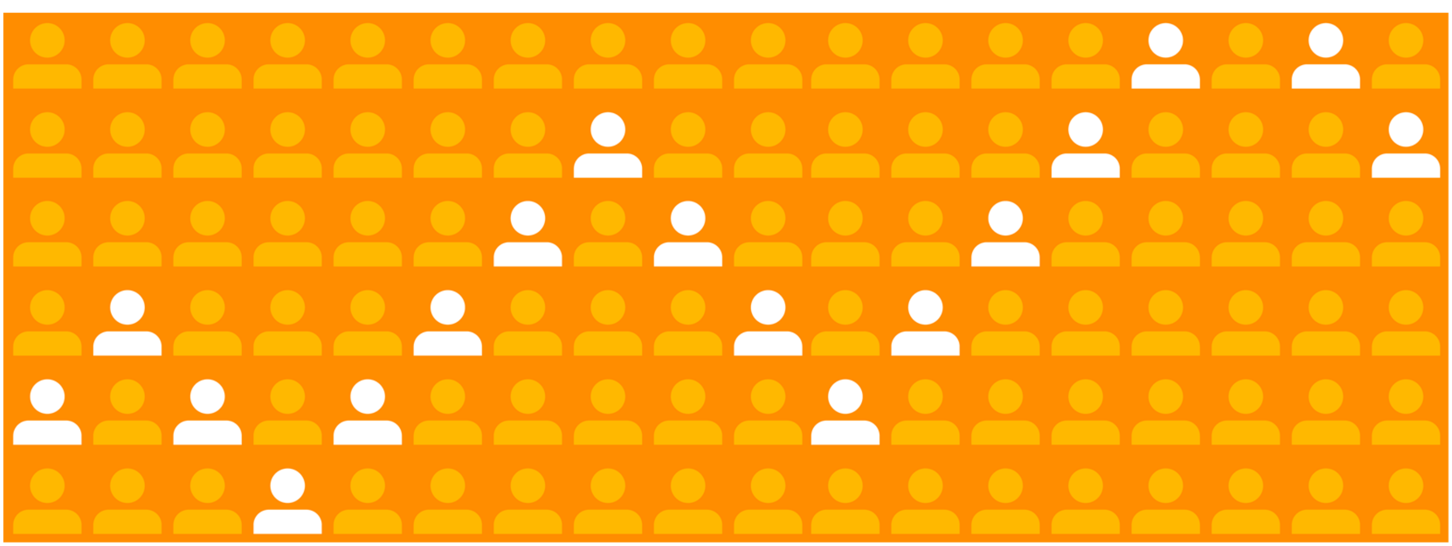
Our expectations by **type of activity**:

- **Divestitures:** We believe divestitures will highlight the M&A landscape in 2019 as larger companies look to divest non-core / non-strategic assets. Recent trends in the sector have shown that obtaining market leadership and scale are critical to success, and using sales proceeds from divestitures of non-core assets allows companies to reinvest where they have a strategic advantage. Unlocking value through spin-offs, divestitures and partnerships / JV's will likely continue during 2019. Following a wave of leadership changes throughout the sector in 2018, new leaders will look to implement their strategic plans to advance their growth agendas in 2019 (both organic and inorganic) and replace divested businesses with products and services more in line with their core competencies.

- **Private Equity:** 2018 was a busy year for private equity, and we see this trend likely accelerating in 2019. Private equity has over $1.5 Trillion of dry-powder, and they have positioned themselves to transact on many of the divestitures and other businesses in the PLS sector. Unlike historical periods, private equity is no longer reactive (e.g. waiting until auction processes); they are proactively looking for take-private opportunities, corporate divestitures, partnerships with mid-market companies, and other alternative structures to bridge the gap between buyers' and sellers' value expectations.

- **Partnerships (Alliances/JVs/Other):** With the continued importance of achieving scale and operational efficiencies, we believe there will be many partnerships (in various forms) as all sub-sectors look to compete against the headwinds facing the broader healthcare sector. With a continued focus on reducing overall healthcare costs, channel consolidation, and the continued integration of the payor/provider landscape, it will become even more critical for companies to compete either through innovation or scale. We also believe there will be more partnerships between larger Rx companies and payors/providers.

- **Capital Markets:** After a strong showing in 2018, we generally see the first half of 2019 being a robust period for Biotech IPOs and other fund-raising activity with some concern for a potential slow down later in the year. The 67 PLS IPOs during 2018* represented an approximately 80% increase from 2017 levels and more than 30% of the overall IPO market. Of the 67 PLS IPOs, approximately 50 were Biotech companies that had strong showings in raising over $5.0B, with almost all (~90%) priced within or above the expected range. Through the remainder of 2018, these Biotech IPOs generated an average return of more than 16%. Overall, some normalization from 2018 highs will occur; however, we anticipate there will still be an appetite for investment in new technologies and growth businesses.



* 2018 IPO data reflects data through mid-December.

Pharma and Life Sciences – 2019 Outlook, *continued*

While we expect all **sub-sectors** to show increases in M&A activity in 2019, each sub-sector's deals will be driven by unique factors:

- **Pharmaceuticals:**
  - *Large Pharma:* We expect to see one or two larger transactions (in addition to the BMS / Celgene combination) as companies seek to gain category leadership and create the necessary scale to compete for the long term. Also, we see significant divestiture activities (sales, spin-offs, and partnerships) within the sub-sector to generate additional capital to use in acquisitions of biotech companies driven by a normalization in capital markets after a year of robust valuations. Cell & gene therapy (oncology & rare disease) being key therapeutic areas of focus.
  - *Spec Pharma / Generics:* Increases in M&A activity will likely be driven by consolidation of mid-market players as they need to add scale to compete (vs. larger generic deals). Additionally, divestitures may also become a key trend as some companies look to de-lever. We see private equity and other domestic middle market players as most active, but expect Chinese and Indian headquartered companies to seize on these opportunities as well.
- **Biotech:** The sub-sector will likely see significant interest from Large Pharma, among others, as capital markets normalize and buyers become more comfortable in executing deals for attractive Biotech targets at lower price points ($5.0B - $10.0B deals that were priced at $15.0B - $20.0B in 2018 due to high valuations).
- **Medical Devices:** Medical Devices could see significant activity driven by new entrants (such as industrial products companies looking to diversify) and new independent medical device companies from recent / potential spin-offs (e.g. Siemens Healthineers, GE Healthcare, etc.). Activity will also be driven by the need for many companies to achieve their growth agendas despite limited organic growth opportunities due to broader healthcare affordability headwinds. We see many mid-sized ($2.0B to $5.0B) transactions as well as a variety of different divestitures as Medical Devices companies look to reshape their portfolios after years of consolidation.
- **Other/Services:**
  - *Animal Health*: We expect 2019 will be an active year within the sub-sector, but may not hit the same highs experienced in 2018. Continued acquisitions by companies that look to diversify their offerings (such as Merck's recent Antelliq acquisition) will be key. The race to 'own the channel' (particularly the farmer) is here and companies will likely continue to bolt-on products to have a broader offering. Overall, with scale and product diversification becoming increasingly important, we see inorganic activity as a key lever companies will use to gain an advantage in the sub-sector. Similar to Elanco's spin from Eli Lilly in 2018, we anticipate the potential for other dual track processes (spin/IPO or sale) as companies, such as Bayer's animal health business, evaluate IPO opportunities against sales to strategic or financial buyers, which may depend on capital market interest in 2019. Lastly, with more independent Animal Health companies, we would expect there to be more capital available for inorganic growth (vs. the historic competition for capital allocation inside a larger conglomerate), which could fuel further M&A activity.
  - *OTC*: Coming off of the recent GSK and Pfizer OTC JV announcement, we believe there is a possibility for at least one additional larger deal to take place in this space, as well as a variety of continued bolt-on deals and divestitures, as many larger OTC businesses look to refine their portfolio. Bayer's ongoing sale of their French OTC business and recent announcement to consider options for Coppertone and Dr Scholls, along with Nestlé's announced potential sale of their skin business, spotlight examples of what is to be expected in 2019, as we anticipate other divestitures from large multi-nationals to follow suit in 2019.
  - *CRO / CMO*: Bolt-on activity will likely continue during 2019 with the potential for some larger independent CRO businesses to be acquired by services companies looking to move into adjacent spaces within the sector.

PwC's Health Research Institute publications

Broader industry trends & insights and potential impact on deals

Major industry issues and trends are driving activity in PLS and are leading indicators to certain areas of M&A. The PwC's HRI publications are at the forefront of these trends and provide a great platform for any M&A professional looking to understand the broader industry trends.

Top health industry issues of 2019: The New Health Economy comes of age

Top Issue 2019: Digital therapeutics

In 2019, new entrants, biopharmaceutical and medical device companies will bring to market digital therapies and connected health services that can help patients make behavioral changes, give providers real-time therapeutic insights, and offer insurers and employers new tools to more effectively manage beneficiaries' health.

Deals impact: Many companies are forming partnerships and acquiring businesses in hopes of better understanding how to maximize the connections or to gain better insights as they realize they may have to buy, build and partner to ultimately succeed.

Top Issue 2019: Workforce of the Future: Your company's new, upskilled worker of the future is you

In 2019, healthcare companies new and old will identify which employees – from the back office to the front lines and all the way up to the c-suite – need to be upskilled or reskilled to get the most out new and impending investments into advanced technologies like artificial intelligence (AI) and robotic process automation (RPA) and start their shift into providing care anywhere through telehealth. With many acquisitions being less about combination of similar profile and cultures, an understanding of the cultural aspect of the deal and using it as a platform to change themselves is forcing many companies to better evaluate how a transaction can be transformational.

Deals impact: These new-wave advanced technologies are allowing companies to divest non-core assets simultaneously with this transformation. No longer are companies burdened by legacy processes impacting stranded costs. New workforce, new technologies and new business models are forcing a better, deeper evaluation of current portfolios and yielding much more proactive portfolio management and ultimately more divestitures.

Clinical trials in the New Health Economy

New digital tools and services can help biopharmaceutical companies overcome the delays and bottlenecks endemic to drug research and development and can improve patient experiences and retention during clinical trials. Making trial participation more convenient and relevant to patients can help bring new drugs to market more rapidly and distinguish products in competitive therapeutic areas.

Deals impact: Companies are partnering and acquiring capabilities to ensure they succeed in this new world.

Coming in early 2019…

Drug Pricing: Changes to Medicare

President Donald Trump, in his "American Patients First" blueprint for drug pricing and through separate announcements, is seeking changes to the way Medicare pays for prescription drugs. A new Medicare Part B proposal, if enacted, could shave off $100.0 million to $1.0B in annual revenues for certain pharmaceutical drugs.

Deals impact: Drug pricing is causing some of the biggest bid / ask value gaps and is having an impact on companies that look to inorganic sources to achieve their growth agendas (as organic growth from pricing is limited).

Please visit https://www.pwc.com/us/en/industries/health-industries/health-research-institute.html to download the publications

About PwC Deals

Bob Saada

PwC Deals Partner,
US Deals Leader

646-471-7219

bob.d.saada@pwc.com

For a deeper discussion on deal considerations, please contact one of our practice leaders or your local Deals partner.

Glenn Hunzinger

PwC Deals Partner,
US Pharmaceutical and Life Sciences Leader

646-895-2462

glenn.hunzinger@pwc.com

Brian Geiger

PwC Deals Principal

773-368-0259

brian.geiger@pwc.com

PwC's Deals professionals help clients understand the risks in transactions so they can be confident that they are making informed strategic decisions. From deal negotiations to capturing synergies during integration, we help clients gain value and ultimately deliver this value to stakeholders. For companies in distressed situations, we advise on crisis avoidance, financial and operational restructuring, and bankruptcy.

PwC's Deals Practice can advise pharmaceutical and life sciences companies and PLS-focused private equity firms on a range of M&A decisions, from identifying acquisition or divestiture candidates and performing detailed buy-side diligence, through developing strategies for capturing post-deal profits, to exiting a deal through a sale, carve-out, or IPO. Our seasoned deals teams combine deep pharmaceutical and life sciences industry skills with local market knowledge. With more than 20,000 deals practitioners worldwide, we can deploy seasoned teams that combine deep health services industry skills with local market knowledge virtually anywhere your company operates or executes transactions.

Although each deal is unique, most will benefit from the broad experience we bring to delivering strategic M&A advice, due diligence, transaction structuring, M&A tax, merger integration, valuation, and post-deal services. In short, we offer integrated solutions tailored to your particular deal situation and designed to help you complete and extract peak value within your risk profile, whether your focus is deploying capital through an acquisition or joint venture, raising capital through an IPO or private placement, or harvesting an investment through the divestiture process.

For more information about M&A and related services in the pharmaceutical and life sciences industry, please visit www.pwc.com/us/pharmadeals, www.pwc.com/us/pharma or www.pwc.com/us/medtech.

For our views on the health industries sector, refer to the Global Pharma & Life Sciences Deals Insights reports on the deals section of our website.

About the data

We define M&A activity as mergers and acquisitions in which targets are US-based companies acquired by US or foreign buyers, or foreign targets acquired by US or foreign pharmaceutical and life sciences companies. We define divestitures as the sale of a portion of a company (not a whole entity) by a US-based or foreign seller. We have based our findings on data provided by industry-recognized sources. Specifically, values and volumes used throughout this report are based on announcement date for transactions with a disclosed deal value greater than $15.0 million, as provided by Capital IQ, as of December 31, 2018, and supplemented by additional independent research.

Information related to previous periods is updated periodically based on new data collected by Capital IQ for deals closed during previous periods but not reflected in previous data sets. Deal information was sourced from Capital IQ and includes deals for which buyers or targets fall into one of the PLS industry sub-sectors: biotechnology, medical devices, pharmaceuticals, or other (such as contract manufacturing organizations). Certain adjustments have been made to the information to exclude transactions that are not specific to the PLS industry. Capital market and equity return information is sourced from Capital IQ.

For media inquiries

Laura Dally

PwC Manager, External Communications

202-774-8524

laura.dally@pwc.com