White Paper

IQVIA Pharma Deals

Half-Year Review of 2020

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Introduction

COVID-19 shakes up the dealmaking landscape

H1 2020 was an unprecedented time for dealmaking in the life sciences sector. While the COVID-19 pandemic rapidly provoked a significant level of partnering activity amongst biopharma companies keen to expedite the development of vaccines or therapeutics to tackle the virus, it also acted as a brake on other types of dealmaking, most notably M&A which saw a sharp decline in activity as a result of uncertainty and operational disruption. Indeed, H1 2020 was notable for the absence of any US$5 B deals on the scale seen in previous years as companies instead focused their attentions on internal programs and potential COVID-19 solutions, opting only for a few asset-driven acquisitions. There was also plentiful capital available to allow biotech companies to stay independent, particularly those in the US. As a result, aggregate spending on M&A by life science companies plummeted to just US$19.1 B in the first 6 months of 2020.

Roche assumed the title of most prolific dealmaker in H1 2020, fending off close competition from AstraZeneca. Licensing deal flow for life science companies remained stable compared with H1 2019, in spite of all the obstacles presented by COVID-19, as licensing-based deals emerged as a preferred alternative to M&A for some big pharma. Licensing deal values rose over this period as a consequence. Infectious diseases overtook oncology to become the principal therapy area for dealmaking in H1 2020 in terms of deal volume, driven by a plethora of deals centered on COVID-19 as life science companies quickly rose to the challenge presented by the virus. Indeed, many companies focused resources on COVID-19 that ordinarily would have been directed elsewhere.

Cancer therapeutics, however, attracted the highest upfront payments with two of the top 3 partnering deals (as ranked by total upfront consideration) being broad collaborations in oncology concerning multiple assets.

Collaborative R&D alliances jumped in number as the industry combined expertise to advance the development of COVID-19 therapeutics and vaccines while pharmaceutical companies looked to supplement their internal R&D endeavors with external research in core therapeutic areas. The aggregate, mean and median total deal values for collaborative R&D agreements all rose significantly from H1 2019 to H1 2020, helped by nine deals potentially worth US$2 B or more in biodollars.

Collaborative R&D alliances jumped in number as the industry combined expertise to advance the development of COVID-19 therapeutics and vaccines.

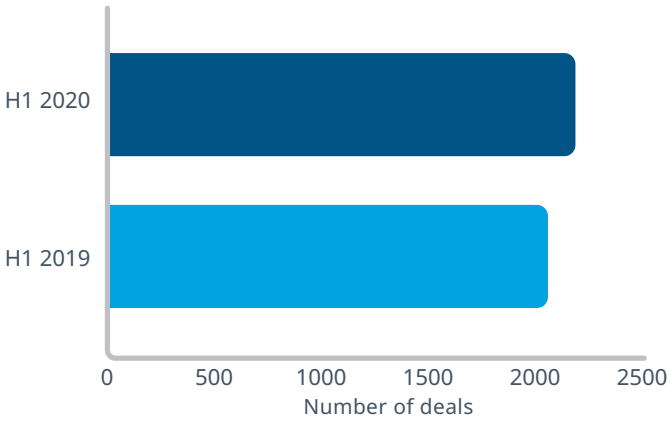
Uncertainty and prudence cause M&A to stall

Following several years of decline, the overall level of deal activity in the life sciences sector rose in H1 2020 as companies hurriedly formed R&D alliances, manufacturing deals and distribution agreements to address the escalating COVID-19 pandemic. Firms also adapted to a new normal of negotiating and closing deals via video calls rather than the usual face to face. A review of the IQVIA Pharma Deals database of publicly disclosed deal activity reveals that the number of agreements signed, excluding standalone research grants, increased by 7% from H1 2019 to H1 2020 (Figure 1). Strikingly, approximately 25% of the deals signed in H1 2020 were related to COVID-19 and there was a pronounced increase in deal activity in June compared to earlier months as pandemic-associated restrictions eased.

While the COVID-19 pandemic severely impacted the global economy in Q1 2020, the life sciences sector was somewhat protected from the negative impact with investors directing significant capital towards drug developers. Venture capital (VC) firms invested US$9.8 B in biotechnology-related industries in H1 2020, up 56% on H1 2019, with a continuing trend towards larger investments being made in a smaller number of companies.[1] At a time when the IPO market was less than welcoming to many industries, the biotech sector performed impressively well in H1 2020, with both biotech IPO volume and value up on H1 2019 after a particularly successful second quarter.

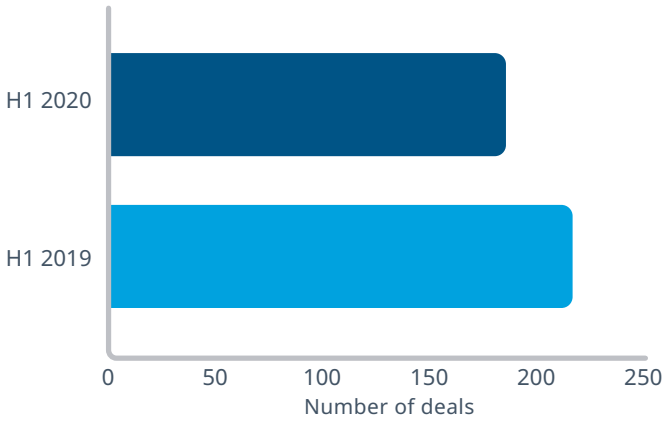
The COVID-19 pandemic had a profound effect on M&A activity (defined here as Mergers, Business Acquisitions and Divestments, signed but not necessarily completed) in H1 2020, with the number of deals announced down 14% on H1 2019 as M&A dropped down the corporate priority list amid a barrage of operational challenges (Figure 2). Moreover, the aggregate total value of all M&A deals signed in H1 2020 plummeted by 91% from the US$223.7 B achieved in the same period the previous year to just US$19.1 B (Table 1). This was accompanied by an 90% drop in the mean total deal value for M&A deals from US$2663 M in H1 2019 to US$277 M in H1 2020. The median total deal value fell to a lesser extent, from US$100 M in H1 2019 to US$59 M in H1 2020. The H1 2019 figures are of course heavily influenced by the inclusion of two mega deals valued at more than US$50 B: Bristol Myers Squibb's US$74 B acquisition of Celgene (Deal no. 89733) and AbbVie's US$63 B takeover of Allergan (Deal no. 92969). Nevertheless, even if these are removed from the data set, H1 2020 still compares poorly to H1 2019 in terms of M&A activity, with the aggregate, mean and median total deal values falling 78%, 74% and 39%, respectively, from H1 2019 to H1 2020.

Figure 1: Number of deals (excluding funding awards), H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

Figure 2: Number of M&A deals, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

[1] PwC, CB Insights Healthcare MoneyTree™ Reports Q1 2020 and Q2 2020

Table 1: Aggregate, mean and median values of M&A deals, H1 2019 vs. H1 2020

ALL DEALS	H1 2019	H1 2020	CHANGE
AGGREGATE VALUE OF ALL M&A DEALS	US$223,652 M	US$19,139 M	-91%
MEAN DEAL VALUE	US$2663 M	US$277 M	-90%
MEDIAN DEAL VALUE	US$100 M	US$59 M	-41%
ALL DEALS (EXCLUDING MEGA DEALS >US$50 B)	**H1 2019**	**H1 2020**	**CHANGE**
AGGREGATE VALUE OF ALL M&A DEALS	US$86,651 M	US$19,139 M	-78%
MEAN DEAL VALUE	US$1057 M	US$277 M	-74%
MEDIAN DEAL VALUE	US$96.5 M	US$59 M	-39%

Source: IQVIA Pharma Deals

Appetite for M&A may not necessarily have diminished but the COVID-19 pandemic has resulted in potential deals being delayed, thanks to the ensuing uncertainty surrounding the disease and with certain aspects of the M&A process hindered by a lack of face-to-face contact, particularly for larger deals. M&A is often driven by clinical trial results and delays to patient enrollment and data read-outs as a result of COVID-19 are also likely to have deferred M&A decisions for many risk-averse pharma companies. Stock market volatility has made it challenging for companies to arrive at prices while escalating asset prices and strong capital markets may also have had parts to play. Aside from the effects of COVID-19, there was increased adoption in H1 2020 of alternative deal structures to M&A, typically broad pipeline-accessing deals with equity components, as dealmakers became more disciplined.

Table 2 presents the top 10 M&A deals of H1 2020 ranked by total potential deal value. Combined, these deals were worth a total of US$14.1 B, equivalent to 74% of the aggregate value of all M&A deals signed in this period. In contrast, the top 10 M&A deals of H1 2019 had a combined value of US$203.1 B. Mega deals were conspicuous in their absence in H1 2020 with, somewhat unusually, only two deals having a value in excess of US$2 B. Thermo Fisher Scientific's failed takeover of molecular diagnostics specialist Qiagen has not been included in the analysis (Deal no. 97492).

The largest biopharmaceutical acquisition of H1 2020 was Gilead Sciences' US$4.9 B purchase of Forty Seven, an immuno-oncology company developing therapies targeting cancer immune evasion pathways and specific cell targeting approaches (Deal no. 97412). The key driver of the deal is Forty Seven's lead drug candidate magrolimab, an anti-CD47 monoclonal antibody being evaluated in multiple clinical studies in patients with blood cancers such as myelodysplastic syndrome (MDS) and acute myeloid leukemia, which has a profile that lends itself to combination therapies. Only 3 months earlier, Forty Seven announced impressive Phase I data for magrolimab in combination with azacitidine that showed an overall response rate of 92% in patients with higher-risk MDS, with 50% of patients achieving a complete response. The deal, which aligns with Gilead's bolt-on acquisition strategy

Table 2: Top M&A deals of H1 2020 ranked by total deal value

TOTAL DEAL VALUE	COMPANIES	DEAL DRIVER
US$4.9 B	Gilead Sciences, Forty Seven	Magrolimab, a monoclonal antibody in multiple clinical studies for diseases including myelodysplastic syndrome, acute myeloid leukemia and diffuse large B-cell lymphoma
US$2.1 B	Novo Nordisk, Corvidia Therapeutics	Ziltivekimab, a fully human monoclonal antibody directed against interleukin-6 (IL-6) being developed to reduce the risk of major adverse cardiovascular events in chronic kidney disease patients with atherosclerotic cardiovascular disease and inflammation
US$1.44 B	Alexion Pharmaceuticals, Portola Pharmaceuticals	Andexxa® (andexanet alfa), marketed as Ondexxya® in Europe, an approved Factor Xa inhibitor reversal agent
US$1.4 B	Invitae, ArcherDX	Genomic analysis products and services, in vitro diagnostic products
US$1.1 B	Eli Lilly, Dermira	Lebrikizumab, an IL-13 antibody being studied in Phase III for the treatment of moderate-to-severe atopic dermatitis
US$825 M	Hypera Pharma, Takeda Pharmaceutical	Portfolio of select OTC and non-core assets in Latin America
US$677 M	Menarini Group, Stemline Therapeutics	Elzonris® (tagraxofusp), a targeted therapy directed to CD123, approved by the US FDA for the treatment of blastic plasmacytoid dendritic cell neoplasm
US$670 M	Orifarm Group, Takeda Pharmaceutical	Portfolio of select non-core OTC and prescription pharmaceutical products sold in Europe, two manufacturing sites
US$537.5 M	PTC Therapeutics, Censa Pharmaceuticals	CNSA-001 (sepiapterin), a clinical-stage investigational therapy for orphan metabolic diseases
US$500 M	Shionogi, Tetra Therapeutics	Portfolio of compounds for the treatment of brain disorders, including BPN14770

Source: IQVIA Pharma Deals

that prioritizes clinical and commercial opportunities, is another attempt by the company to bolster its immuno-oncology pipeline.

Like the Gilead/Forty Seven deal, many of the top M&A deals of H1 2020 were asset-driven, bolt-on acquisitions. In its largest takeover to date, Novo Nordisk pledged up to US$2.1 B to acquire Corvidia Therapeutics, a clinical-stage company focused on cardio-renal therapeutics (Deal no. 98749). The move gives Novo, which has historically eschewed M&A and focused instead on its internal capabilities, access to Corvidia's lead candidate ziltivekimab, a monoclonal antibody in Phase II development to reduce the risk of major cardiovascular adverse events in patients with chronic kidney disease who have atherosclerosis. Novo Nordisk has been looking to diversify its revenue base following the loss of patent protection on its top-selling diabetes drug, Novolog® (insulin aspart).

In a deal that perplexed many industry analysts, in May Alexion Pharmaceuticals announced that it was to acquire Portola Pharmaceuticals for US$1.44 B (Deal no. 97911). The deal gives Alexion access to Andexxa®/Ondexxya® (andexanet alfa), the only approved Factor Xa inhibitor reversal

agent on the market that has underperformed to date, generating sales of just US$111 M in 2019 and failing to meet consensus expectations amid manufacturing and hospital access issues (IQVIA Analytics Link). Alexion contends that the buyout is part of a long-term diversification strategy to reduce the company's over-reliance on its flagship product Soliris® (eculizumab), which accounted for 79% of the company's revenue in 2019 but faces impending biosimilar competition. To achieve this, the company aims to leverage its existing presence in the hospital setting to expand the addressable market for Andexxa by pursuing geographic and label expansion for the drug. Nevertheless, concerns have been raised that Andexxa, which is used in emergency situations, requires a different sales approach to Alexion's existing therapies, which are used in the treatment of chronic rare diseases.

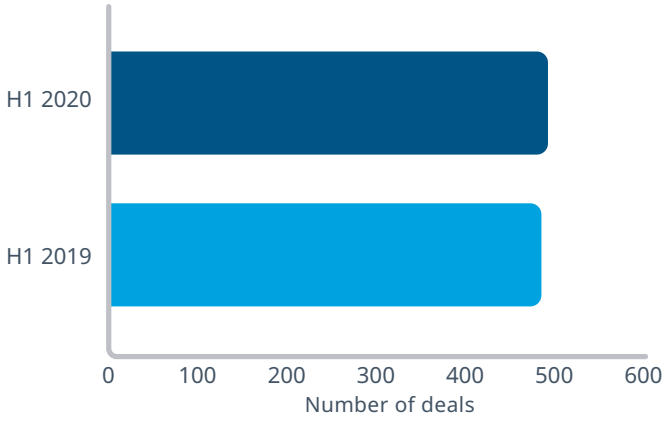
Takeda Pharmaceutical features twice on the list thanks to divestment deals with Orifarm Group (Deal no. 97830) and Hypera Pharma (Deal no. 97414) for select OTC and non-core assets in Europe and Latin America, respectively. The deals continue Takeda's divestiture strategy as part of which the company aims to offload approximately US$10 B in non-core assets in order to focus on its key business areas and reduce the debt burden it took on with its £46 B (US$62.3 B) acquisition of Shire (Deal no. 85249). It has been rumored that the deals could be a precursor to the eventual sale of Takeda's consumer health division.

In spite of all the challenges presented by COVID-19, the level of licensing activity in the life sciences sector was stable from H1 2019 to H1 2020.

Licensing deal values continue to rise

In spite of all the challenges presented by COVID-19, the level of licensing activity in the life sciences sector was stable from H1 2019 to H1 2020, with licensing deal volume up 2% over this period (Figure 3). Licensing activity had reached a 5-year low in 2019, however, as a consequence of increasing selectivity on the part of licensees, high asset valuations and the use of alternative option-based deal structures. Operational disruption, pipeline prioritization and a desire to preserve cash all contributed to the constrained level of licensing activity seen in H1 2020. While the COVID-19 pandemic may have delayed deals that were on course to be signed in H1 2020, it also created licensing opportunities for companies with vaccine technologies, diagnostic platforms and antiviral programs with potential for repurposing.

Figure 3: Number of licensing deals, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

The aggregate potential total deal value of all licensing deals signed in H1 2020 was US$67.3 B, 24% higher than in H1 2019. At US$522 M, the mean TDV for all licensing deals in H1 2020 was 20% higher than the equivalent figure for H1 2019 (US$434 M), while the median total deal value (arguably a better measure of the 'average') rose by 59% to US$175 M (Table 3). These increases in licensing deal values may reflect increasing breadth on the part of licensing deals, influenced by early-stage platform deals pertaining to multiple targets

Table 3: Aggregate, mean and median values of licensing deals, H1 2019 vs. H1 2020

ALL DEALS	H1 2019	H1 2020	CHANGE
AGGREGATE VALUE OF ALL LICENSING DEALS	US$54,240 M	US$67,279 M	+24%
MEAN TOTAL DEAL VALUE	US$434 M	US$522 M	+20%
MEDIAN TOTAL DEAL VALUE	US$110 M	US$175 M	+59%
MEAN UPFRONT PAYMENT	US$46.8 M	US$48.5 M	+4%
MEDIAN UPFRONT PAYMENT	US$12.9 M	US$10 M	-22%

Source: IQVIA Pharma Deals

worth many billions in biodollars. Perhaps suggestive of continued discipline on the part of licensees, the mean upfront payment for all licensing deals rose from US$46.8 M in H1 2019 to US$48.5 M in H1 2020, an increase of just 4%, while the median value actually fell by 22% to US$10 M. In line with this, licensees committed to pay a total of US$4.4 B in guaranteed upfront licensing payments in H1 2020, up only 1% on the same period the previous year. It must be noted that our analysis concerns not only straight licensing agreements but also multicomponent deals that involve both elements of licensing and licensing options.

The top 10 partnering deals by upfront payment in H1 2020, excluding settlement deals and product acquisitions, are shown in Table 4.

The largest upfront consideration for a partnering deal in H1 2020 was the US$900 M in cash and equity that Incyte pledged to MorphoSys for global rights to the Fc engineered anti-CD19 antibody tafasitamab, which in combination with lenalidomide has since been approved in the US for relapsed or refractory diffuse large B-cell lymphoma (Deal no. 96537). MorphoSys is also eligible to receive up to US$1.1 B in development, regulatory and commercial milestones, as well as tiered royalties on ex-US net sales of tafasitamab in the mid-teens to mid-twenties percentage range and a profit share in the US where the two companies will co-commercialize the drug candidate. The deal represents an attempt by Incyte to reduce its reliance on Jakafi® (ruxolitinib), which accounted for 95% of its global revenues in 2019 (IQVIA Analytics Link). It also replenishes the company's late-stage pipeline following a series of high-profile setbacks, most recently the failure of itacitinib in a Phase III trial in graft-versus-host disease. Concerns have been raised, however, about Incyte's limited commercial experience outside of the US given the significant competition it will face in the hematology-oncology market.

Two of the top 3 partnering deals of H1 2020 are broad collaborations for the advancement of multiple immuno-oncology assets that offer multiple shots on goal. In its largest deal to date, Genmab recruited AbbVie in June to help develop and commercialize three of its early-stage bispecific antibody programs: the CD20-targeting bispecific epcoritamab (DuoBody®- CD3xCD20), DuoHexaBody®-CD37 and DuoBody®-CD3x5T4 (Deal no. 98504). The companies also entered into a discovery research collaboration to develop up to four additional antibody therapeutics across both solid tumors and hematological malignancies. Genmab received a substantial US$750 M upfront and is eligible to receive up to US$3.15 B in additional development, regulatory and

Table 4: Top partnering deals (excluding settlements and product acquisitions) by upfront payment, H1 2020

TOTAL DEAL VALUE	UPFRONT PAYMENT	COMPANIES	INTEREST AREA	DEVELOPMENT PHASE
US$1955 M	US$900 M (US$750 M cash upfront + US$150 M equity investment)	MorphoSys, InCyte	Tafasitamab (MOR208), an Fc-engineered antibody against CD19 for B-cell malignancies	Preregistration, Phase II
US$3900 M	US$750 M	Genmab, AbbVie	Co-development and co-commercialization of three next-generation bispecific antibody products for cancer plus discovery research collaboration	Phase I/II, IND, Discovery
US$2150 M	US$375 M (US$175 M cash upfront + US$200 M equity investment)	Arcus Biosciences, Gilead Sciences	Co-development and co-commercialization of current and future immuno-oncology therapies in Arcus' pipeline	Phase II, Phase I, Discovery
US$2720 M	US$350 M (US$125 M cash upfront + US$225 M equity investment)	Sangamo Therapeutics, Biogen	Gene regulation therapies in neurology, including ST-501 for tauopathies and ST-502 for synucleinopathies	Preclinical, Discovery
US$250 M	US$250 M equity investment	Vir Biotechnology, GlaxoSmithKline	Products for the prevention, treatment and prophylaxis of diseases caused by SARS-CoV-2	Discovery
US$225 M	US$200 M (US$125 M cash upfront + US$75 M equity investment)	Ultragenyx Pharmaceutical, Daiichi Sankyo	Adeno-associated virus-based gene therapy manufacturing technologies	Discovery
Several billion dollars	US$190 M	Arrakis Therapeutics, Roche	RNA-targeted small molecule drugs against a broad set of targets across all of Roche's R&D areas	Discovery
US$748 M	US$185 M (US$72 M cash upfront + US$113 M equity investment)	BioNTech, Pfizer	COVID-19 vaccine candidates based on BioNTech's mRNA vaccine platforms	Preclinical
Several billion dollars	US$135 M	Vividion Therapeutics, Roche	Small molecules for E3 ligases and select oncology and immunology targets	Discovery
US$308 M	US$130 M	Valneva, Pfizer	Lyme disease vaccine candidate VLA15	Phase II

Source: IQVIA Pharma Deals

sales milestone payments for all programs as well as tiered royalties. AbbVie is a logical partner for Genmab and the deal comes as the US company is under pressure to find new growth drivers as it faces multiple patent expirations in the near-term, most notably Humira® (adalimumab) which will lose exclusivity in the US in 2023. The deal, which will bolster AbbVie's burgeoning oncology portfolio, positions the company in the race to develop a CD20 bispecific antibody, although somewhat behind Roche and Regeneron Pharmaceuticals whose product candidates mosunetuzumab and REGN1979, respectively, have reported encouraging response rates across a number of lymphoma types.

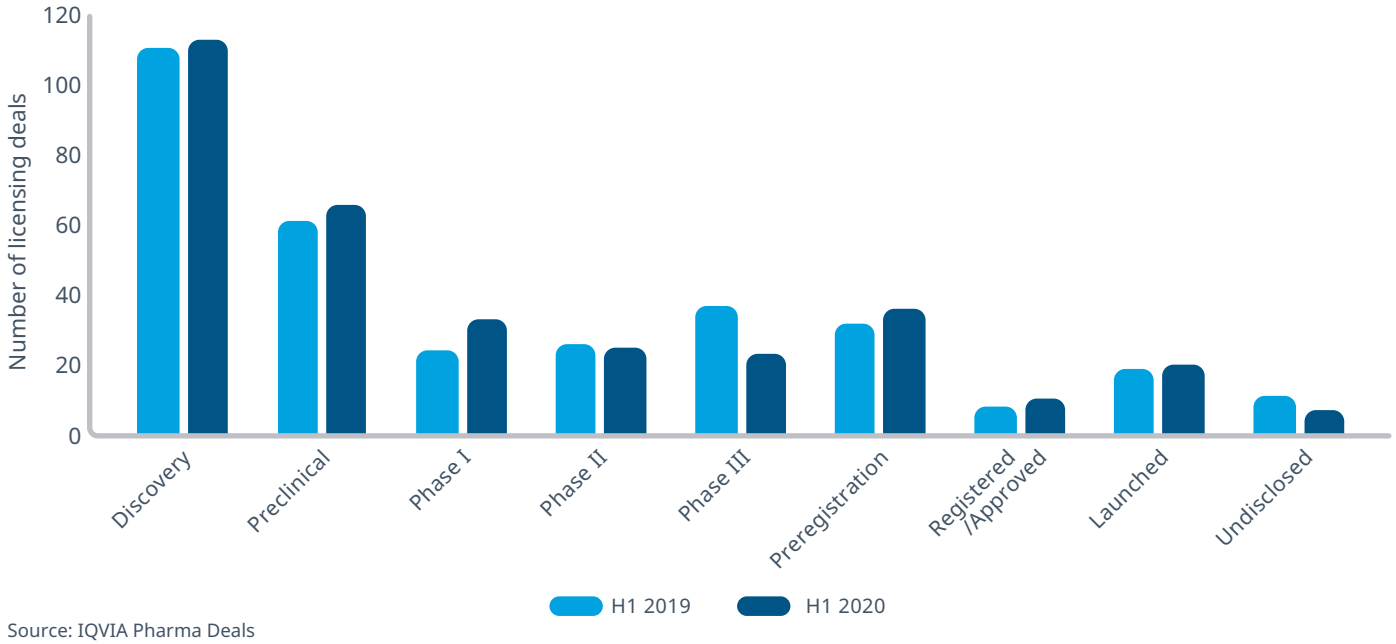
In one of several portfolio-enhancing oncology deals for the company in H1 2020, Gilead formed a 10-year partnership with Arcus Biosciences in May to co-develop and co-commercialize all current and future therapeutic product candidates in Arcus' pipeline in exchange for US$375 M upfront in cash and equity (Deal no. 98195). With the deal, Gilead gains immediate access to Arcus' anti-PD-1 (programmed cell death-1) antibody, zimberelimab, and opt-in rights to the company's other clinical candidates. Gilead remains under intense pressure to seek new revenue drivers to offset declining sales from its blockbuster hepatitis C virus franchise. The alliance is reminiscent of the pipeline-accessing deal Gilead signed with Galapagos in July 2019 (Deal no. 93355), enabling Arcus to maintain its independence while benefiting from the resources, capital and expertise of Gilead. The upfront portion of the deal is significantly lower than that received by Galapagos, however, and investors were disappointed by the structure of the deal, with many hoping for a buyout instead.

Two COVID-19 deals make the top partnering deals list: Vir Biotechnology's partnership with GlaxoSmithKline (GSK) to accelerate the development of its antibody candidates VIR-7831 and VIR-7832 plus other potential solutions (Deal no. 97754), and Pfizer's collaboration with existing partner BioNTech to advance development of an mRNA vaccine (Deal no. 97661). GSK agreed to make a US$250 M equity investment in Vir while Pfizer agreed to pay BioNTech US$185 M upfront in cash and equity. Financial terms were not disclosed for many of the COVID-19 alliances established in H1 2020. Gene therapy is also represented on the list thanks to Biogen's US$350 M upfront partnership with Sangamo Therapeutics to develop gene editing therapies in neurology (Deal no. 97385) and Daiichi Sankyo's US$225 M partnership with Ultragenyx Pharmaceuticals focused on gene therapy manufacturing technology (Deal no. 97758). Demonstrating its continued preference for discovery-stage alliances, in H1 2020 Roche established collaborations with Arrakis Therapeutics (Deal no. 97771) and Vividion Therapeutics (Deal no. 98087) to develop RNA-targeted small molecule drugs and selective small molecules targeting E3 ligases, respectively. Both deals are potentially worth several billion dollars and have upfront payments in excess of US$100 M.

Figure 4 presents an analysis of therapeutic licensing deals by development phase. Where deals concern multiple assets or assets in different stages of development for different indications, the highest achieved development phase has been selected for the analysis. A similar level of licensing activity for therapeutic programs was seen in H1 2019 and H1 2020, mirroring the overall trend for licensing deals in the life sciences sector over this period. Continued enthusiasm for next-generation technology platforms and novel therapeutic modalities, particularly in oncology, helped maintain a robust level of dealmaking at the preclinical and discovery stages, boosted by licensing deals related to potential COVID-19 treatments.

One striking feature of Figure 4 is the 38% decline in the number of licensing deals for Phase III assets from H1 2019 to H1 2020, perhaps a consequence of a dearth of sufficiently desirable assets at this development phase as well as clinical development delays occurring as a consequence of the COVID-19 pandemic. Negotiations may also have been adjourned for potential licensing deals granting rights to late-stage assets in Asian markets; such deals have accounted for a significant proportion of Phase III licensing deals in recent years. Interestingly, the drop in Phase III

Figure 4: Therapeutic licensing deals by development stage, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

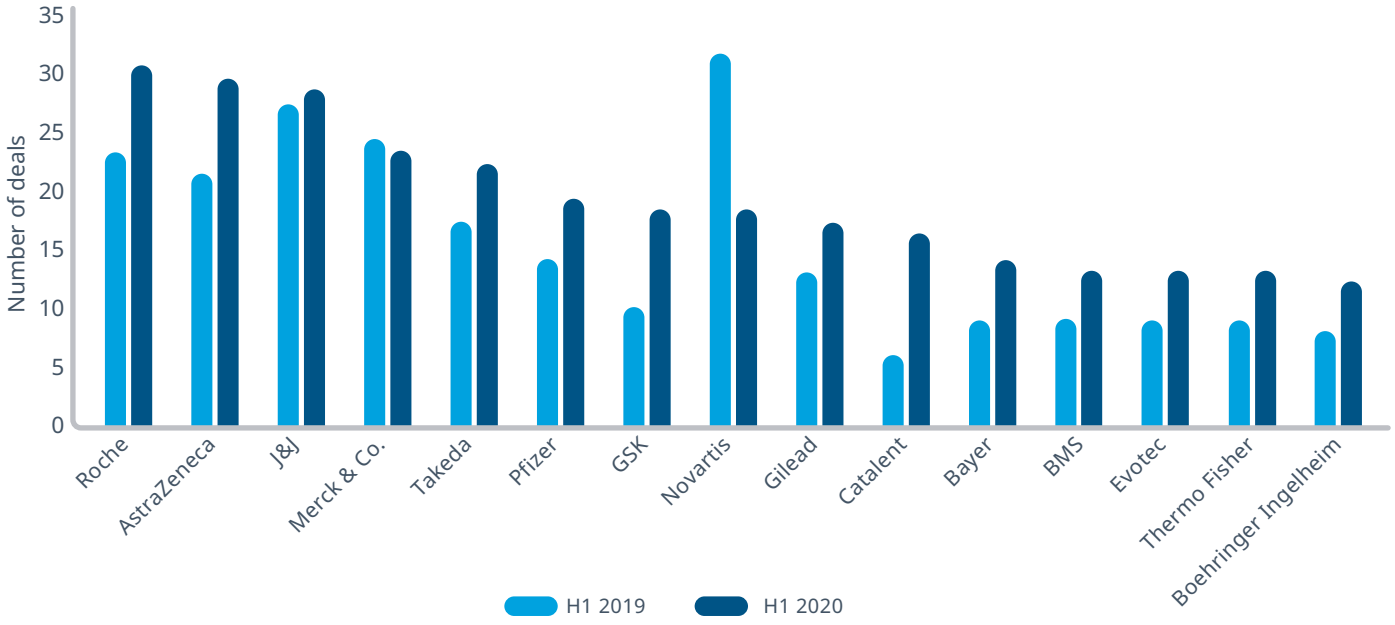
licensing activity was accompanied by a 38% increase in licensing deals centered on Phase I assets, in line with a perceived shift towards earlier stage dealmaking.

The majority of Phase II licensing deals signed in H1 2020 were regional deals, often for Asian markets such as Regeneron Pharmaceuticals' US$30 M upfront collaboration with Zai Labs granting rights to REGN1979 in mainland China, Hong Kong, Taiwan and Macau (Deal no. 98166). The largest single-asset Phase II licensing deal saw Kyowa Hakko pay MEI Pharma US$100 M upfront to license global rights to ME-401, an oral, once-daily phosphatidylinositol-3 kinase delta (PI3K delta) inhibitor, in clinical development for the treatment of B-cell malignancies in a deal potentially worth up to US$682.5 M (Deal no. 97765). There was limited big pharma participation at this development stage beyond Gilead's in-licensing deal with the Rockefeller University for a portfolio of HIV antibodies, including Phase II 3BNC117 (Deal no. 96459), and Takeda's out-licensing of seven programs in its early-to-mid-stage psychiatry pipeline, including a Phase II program in schizophrenia, to Neurocrine Biosciences in return for US$120 M in upfront cash (Deal no. 98810). The Japanese company also out-licensed certain rights to TAK-580 to Day One Biopharmaceuticals (Deal no. 98387).

Increases were registered in the number of licensing deals for preregistration, approved and commercial-stage assets from H1 2019 to H1 2020, with many such deals involving single territory or regional licenses and relating to niche products, generics, drugs late in their life cycle or antivirals such as remdisivir with potential in the treatment of COVID-19.

Continued enthusiasm for next-generation technology platforms and novel therapeutic modalities, particularly in oncology, helped maintain a robust level of dealmaking at the preclinical and discovery stages, boosted by licensing deals related to potential COVID-19 treatments.

Figure 5: Most prolific dealmakers, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

Roche pips AZ to title of most active dealmaker

Roche was the most prolific dealmaker in the first 6 months of 2020 with 30 publicly disclosed deals, seven more than the same period the previous year (Figure 5). The company has climbed two places in the deal activity rankings since H1 2019, overtaking both Johnson & Johnson and Novartis to reach the top position. In characteristic style, Roche's four highest value deals of H1 2020 in terms of total potential deal value were all discovery-stage alliances in its core therapeutic areas. In June, the company formed a broad collaboration with Chinese biotech Innovent Biologics to discover and develop multiple products for hematological and solid cancers, including cellular therapies and bispecific antibodies, in a deal with a headline value in excess of US$2 B (Deal no. 98716). Also in the oncology field, Roche's Genentech arm partnered with Bicycle Therapeutics to discover, develop and commercialize immuno-oncology therapies based on the UK-based biotech's bicyclic peptide Bicycle® technology in a US$1.7 B deal (Deal no. 97324). Bicycles possess pharmacological properties normally associated with a biologic but with the manufacturing and pharmacokinetic advantages of a small molecule and Bicycle's technology has already received validation via deals with AstraZeneca (Deal no. 75228) and Sanofi's Bioverativ (Deal no. 80916) in indications beyond oncology. As noted earlier, Roche also signed two of the top 10 partnering deals of H1 2020 as ranked by upfront payment.

AstraZeneca took second position in the deal activity rankings in H1 2020, just behind Roche with 29 deals. The company's high level of dealmaking is in part a consequence of its involvement in the development of a COVID-19 vaccine with the University of Oxford (Deal no. 97865), which has necessitated the signing of multiple manufacturing, supply and funding deals, most notably a US$1 B investment from the US Biomedical Advanced Research and Development Authority (BARDA) (Deal no. 98140). AstraZeneca did look externally to bolster its R&D endeavors in H1 2020, however, with its most notable deals including a US$4 B collaboration with Silence Therapeutics to develop siRNA therapies for cardiovascular, renal, metabolic and respiratory diseases (Deal no. 97769) and a US$55 M upfront alliance with Accent

Therapeutics aimed at developing new therapies targeting RNA-modifying proteins for the treatment of cancer (Deal no. 98403). It also continued its externalization strategy, offloading rights to legacy products to Atnahs Pharma (Deal no. 96730), RedHill Biopharma (Deal no. 97297) and Taiyo Pharma (Deal no. 97906).

Novartis' deal volume fell 42% from H1 2019 to H1 2020, with the company signing few pipeline-enhancing deals in the first 6 months of 2020. A partnership with TScan Therapeutics to discover and develop T-cell receptor (TCR)-engineered T-cell therapies is the only Novartis deal to be announced in H1 2010 with any noteworthy financials: an upfront technology access fee and research funding totaling US$30 M plus potential milestone payments contingent on clinical, regulatory and sales success that could aggregate in the hundreds of millions of dollars (Deal no. 97776). In contrast, Gilead's deal volume increased 31% from H1 2019 to H1 2020 as the company spent richly in a bid to diversify its R&D portfolio away from antivirals. Aside from acquiring Forty Seven and partnering with Arcus, Gilead entered the microbiome space by collaborating with Second Genome to identify biomarkers and potential new drug targets in inflammation, fibrosis and other diseases (Deal no. 97766), signed an option-based deal with Kyverna Therapeutics to develop engineered T-cell therapies for the treatment of autoimmune disease (Deal no. 96520) and spent US$275 M to acquire a 49.9% equity interest in Pionyr Immunotherapeutics in a deal that also gave it an exclusive option to purchase the remainder of the company for up to US$1.47 B (Deal no. 98932).

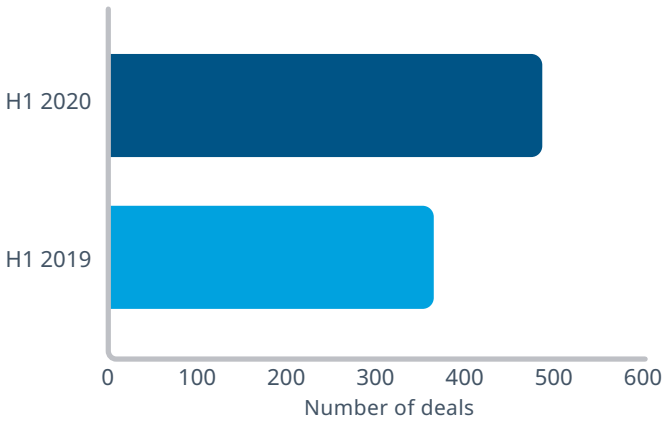
In characteristic style, Roche's four highest value deals of H1 2020 in terms of total potential deal value were all discovery-stage alliances in its core therapeutic areas.

COVID-19 pandemic drives increase in R&D collaboration

R&D alliances found favor in H1 2020 as life science companies embraced a spirit of collaboration to advance the development of COVID-19 vaccines and therapeutic interventions with the aim of preventing disease or speeding recovery. There was also a rush to develop diagnostics to accurately detect past or current infections while existing partners broadened the scope of ongoing collaborations to include COVID-19 R&D. Accordingly, the level of collaborative R&D dealmaking (defined here as discovery or preclinical-stage deals that involve two or more parties actively collaborating on R&D) in H1 2020 was up by an impressive 33% on the same period the previous year, outpacing the overall increase in dealmaking in the life science sector significantly (Figure 6).

Discovery-stage deals remain the industry's sweet spot with big pharma increasingly keen to access cutting-edge technology at the earliest opportunity, often through broad deals offering multiple opportunities for success. Structured deals, often involving options, remain a popular risk-mitigating tool for many large companies.

Figure 6: Number of collaborative R&D deals, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

With platform deals and multicomponent R&D alliances the order of the day, the aggregate total deal value, excluding royalties, for collaborative R&D deals rose 27% from H1 2019 to H1 2020 to reach an all-time high of US$45.9 B. While the mean total deal value for collaborative R&D deals rose 31% to reach US$1119 M in H1 2020, breaking the US$1 B barrier for the first time, the median total deal value increased more significantly from US$450 M to US$731 M (Table 5).

Selected collaborative R&D deals are profiled in Table 6.

Table 5: Aggregate, mean and median values of collaborative R&D deals, H1 2019 vs. H1 2020

ALL DEALS	H1 2019	H1 2020	CHANGE
AGGREGATE VALUE OF ALL R&D DEALS	US$35,991 M	US$45,862 M	+27%
MEAN TOTAL DEAL VALUE	US$857 M	US$1119 M	+31%
MEDIAN TOTAL DEAL VALUE	US$450 M	US$731 M	+62%

Source: IQVIA Pharma Deals

Table 6: Selected collaborative R&D deals, H1 2020

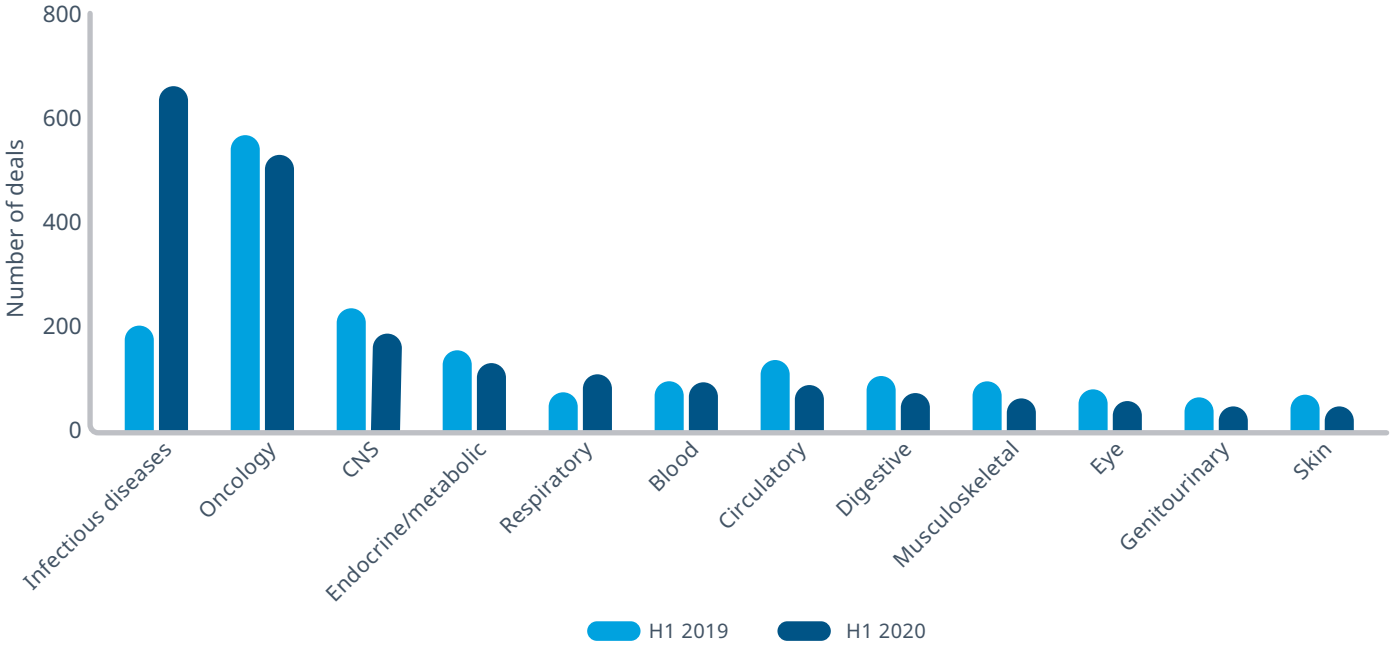
TOTAL DEAL VALUE	UPFRONT PAYMENT	COMPANIES	INTEREST AREA	DEVELOPMENT PHASE (NO. PROGRAMS/ TARGETS)
US$4546 M	US$100 M (US$50 M cash upfront + US$50 M equity investment)	Fate Therapeutics, Janssen Biotech	Induced pluripotent stem cell (iPSC)-derived chimeric antigen receptor (CAR) natural killer cell and CAR T-cell product candidates	Discovery (up to 4)
US$4080 M	US$80 M (US$60 M cash upfront + US$20 M equity investment)	Silence Therapeutics, AstraZeneca	siRNA therapeutics for the treatment of cardiovascular, renal, metabolic and respiratory diseases	Discovery (up to 10 targets)
US$3065 M	US$65 M (US$50 M cash upfront + US$15 M equity investment)	Repare Therapeutics, Bristol Myers Squibb	Therapeutics for select validated synthetic lethal precision oncology targets	Discovery (Multiple)
US$3030 M	US$120 M (US$100 M cash upfront + US$20 M equity investment)	Ideaya Biosciences, GlaxoSmithKline	Synthetic lethality programs targeting MAT2A, Pol Theta, and Werner Helicase	Preclinical (3)
US$2580 M	US$80 M	CytomX Therapeutics, Astellas Pharma	T-cell engaging bispecific antibodies targeting CD3 and tumor cell surface antigens for the treatment of cancer	Discovery (up to 6)

Source: IQVIA Pharma Deals

The largest collaborative R&D deal of H1 2020 in terms of total potential deal value was Fate Therapeutics' collaboration and option agreement with Janssen Biotech to develop induced pluripotent stem cell (iPSC)-derived chimeric antigen receptor (CAR) natural killer cell and CAR T-cell cancer immunotherapies for up to four tumor-associated antigen targets (Deal no. 98005). The deal is worth up to US$4.5 B, including an upfront consideration of US$100 M (comprised of US$50 M in cash and a US$50 M equity investment), and aims to overcome the numerous limitations associated with the production of first-generation CAR therapies that require patient-sourced cells, such as toxicity issues, batch-to-batch manufacturing variability and reimbursement concerns. Cell therapy platforms were also the focus of high-value collaborative R&D alliances in immuno-oncology between Immatics Biotechnologies and GSK (Deal no. 97183) and Astellas Pharma and Adaptimmune Therapeutics (Deal no. 96540).

In precision oncology, the research area of synthetic lethality attracted significant big pharma interest in H1 2020 with two collaborative R&D deals being signed each worth more than US$3 B in biodollars. Synthetic lethality involves cells tolerating the loss of single genes in isolation but not in combination. As such, combinations of defects exist that create unique vulnerabilities in cancer cells which, when identified, present opportunities for tumor-specific treatments. In May, Repare Therapeutics received significant commercial validation of its CRISPR-enabled genome-wide synthetic lethal target discovery platform, SNIPRx®, when it partnered with Bristol Myers Squibb to jointly identify multiple synthetic lethal precision oncology targets for drug candidates (Deal no. 98208). As part of the agreement, Repare's first big pharma partnership, Bristol Myers Squibb made an upfront payment of US$65 M, including a US$15 M equity investment. The following month, GSK paid Ideaya Biosciences US$100 M upfront and committed to make a US$20 M equity investment in the company as part of a partnership centered on the biotech company's synthetic lethality programs targeting MAT2A, Pol Theta and Werner Helicase (Deal no. 98660).

Figure 7: Number of deals (excluding funding awards) by therapeutic area, H1 2019 vs. H1 2020



Source: IQVIA Pharma Deals

Infectious diseases replace oncology as top therapeutic area for dealmaking

The COVID-19 pandemic had a material impact on the nature of deal activity in the life sciences sector in H1 2020. In an unprecedented move, infectious diseases displaced oncology as the principal therapy area for dealmaking, with the number of infectious disease deals more than triple the level seen in H1 2019 (Figure 7). This major upturn in deal activity came at the expense of other therapy areas, almost all of which saw a notable decline in deal activity from H1 2019 to H1 2020, with the exception of diseases of the respiratory system which recorded a 35% increase in deal volume due to the signing of deals focused on COVID-19-related respiratory diseases such as pneumonia. Diseases of the circulatory system and diseases of the genitourinary system suffered the largest declines, with deal activity in each of these therapy areas down 36% in the first 6 months of 2020. Of the deals signed in H1 2020 that were ascribed an indication, approximately 36% involved infectious diseases and approximately 29% involved oncology, with demand for oncology assets and technologies remaining high in this fiercely contested sector. CNS, endocrine/metabolic diseases and diseases of the respiratory system comprised the third, fourth and fifth most prevalent therapy areas for deals signed in H1 2020, respectively.

In stark contrast to previous years, there was significant big pharma involvement in infectious disease dealmaking in H1 2020, with a steady stream of quickly established COVID-19 alliances involving biotech companies, universities and/or government agencies bringing together complementary technical and scientific expertise. A range of approaches are being pursued, including vaccines to prevent the disease and neutralizing antibodies from recovered patients to treat active infection. Sanofi established a number of COVID-19 vaccine partnerships: with BARDA to investigate an advanced preclinical SARS vaccine candidate that could be modified to protect against COVID-19 (Deal no. 97141); with GSK to develop an adjuvanted vaccine using technology from both companies (Deal no. 97774); and with Translate Bio to develop an mRNA vaccine, drawing upon a 2018 agreement between the parties to develop vaccines for infectious diseases using mRNA technology (Deal no. 85914). Eli Lilly teamed up with AbCellera in March 2020 to co-develop antibody therapies for COVID-19 by leveraging the Canadian biotech's rapid pandemic response platform (Deal no. 97608). In a further collaborative research effort, 15 pharmaceutical companies, including Novartis and GSK, agreed to share libraries of molecular compounds that already have some degree of safety and activity data with the COVID-19 Therapeutics Accelerator for screening for potential against COVID-19 (Deal no. 97777).

The volume of deals concerning CNS diseases fell 20% from H1 2019 to H1 2020, although high-value agreements relating to novel modalities such as gene therapies and RNAi therapeutics continued to be signed, spurred by regulatory successes for products in these therapeutic categories and continuing high levels of unmet need. The Biogen/Sangamo alliance was the largest CNS deal to be signed in H1 2020 in terms of both total deal value and total upfront consideration. A number of CNS deals addressed persisting challenges surrounding delivering therapeutics to the brain and CNS such as Vertex Pharmaceuticals' US$1.6 B gene therapy vector partnership with Affinia Therapeutics (Deal no. 97837). The deal gives Vertex access to Affinia's library of adeno-associated virus capsids to complement its existing gene therapy efforts for the treatment of Duchenne muscular dystrophy, myotonic dystrophy 1 and cystic fibrosis. Similarly, Eli Lilly is to leverage Evox Therapeutics' exosome loading and CNS-targeting technologies to develop RNAi and antisense oligonucleotide drugs for the treatment of neurological disorders (Deal no. 98471).

Outlook for H2 2020

The COVID-19 pandemic brought considerable uncertainty to the life sciences sector in H1 2020 and many obstacles to dealmaking persist. Nevertheless, more deals were signed in June than in any other month in H1 2020, which suggests that companies are adapting to having to complete deal negotiations online. While this rise in deal activity may in part be the result of delays in finalizing deals that otherwise would have been signed earlier in the year, H2 2020 certainly holds promise for robust deal volume, particularly for mutually beneficial partnering deals and other transactions that are structured to mitigate risk. Although investment dollars will continue to flow into the industry, emerging biotech companies that have faced operational disruption and development delays may once again look to partnering deals as an additional source of capital at a time when portfolio prioritization and dwindling cash runways lay heavy on their minds. Upfront payments may therefore rise as a result.

After stagnating in H1 2020, M&A activity may slowly pick up in the second half of the year, with small bolt-on acquisitions in oncology and cell or gene therapy more likely than larger scale deals, which may be off the cards for some time yet. While suppressed valuations may create some M&A opportunities, a number of large companies are prudently focusing resources internally at present, as evidenced by AstraZeneca's decision not to pursue a takeover of Gilead after it had informally approached the company about a potential deal. The impending US election could also negatively influence M&A activity in H2 2020, and some companies may opt to preserve cash to finance their operations rather than deploy capital towards M&A as uncertainty continues.

Delays in enrolling patients in clinical trials will likely have a knock-on effect on the dealmaking landscape, potentially deferring agreements that otherwise would have been signed in H2 2020 as potential partners or acquirers wait for data read-outs or prompting a shift towards earlier stage dealmaking. AstraZeneca's US$1 B staged upfront deal with existing partner Daiichi Sankyo for DS-1062, a trophoblast cell-surface antigen 2 (TROP2)-directed antibody drug conjugate in Phase I development for the treatment of multiple tumor types, demonstrates that big pharma is still willing to pay richly for prized assets in core therapy areas (Deal no. 99879). DS-1062 is a potential rival to Immunomedics' Trodelvy™ (sacituzumab govitecan), which was approved by the FDA in April 2020 for use in the treatment of triple negative breast cancer. Also in July, Roche pledged US$775 M upfront in cash and equity to Blueprint Medicines for rights to the small molecule RET inhibitor pralsetinib, which has been filed for regulatory approval in the US and Europe after impressive clinical data showing a 91% overall response rate in RET fusion thyroid cancer (Deal no. 99475). Blueprint had been touted as a takeover target, however, so Roche's decision to opt for a licensing-based deal suggests the perceived shift from M&A towards licensing-based arrangements seen in H1 2020 may continue in the second half of the year.

While suppressed valuations may create some M&A opportunities, a number of large companies are prudently focusing resources internally at present, as evidenced by AstraZeneca's decision not to pursue a takeover of Gilead after it had informally approached the company about a potential deal.

Significant deal volume relating to COVID-19 is expected, at least in the short term as new dealmaking opportunities are created, while oncology will remain at the top of the partnering agenda for many biopharmaceutical companies. As products increasingly become pipelines in their own right, big pharma will continue to exercise selectivity in the external assets they choose to access, predominantly seeking best- or first-in-class potential. A number of major pharmaceutical companies remain overly reliant

on single products and face continuing pressure to seek diversification ahead of impending patent expiries. Sanofi, for example, was comparatively quiet on the dealmaking front in H1 2020, failing to make the most prolific dealmakers list, but is reportedly prepared to spend billions to supplement its internal R&D efforts and in July announced a deal to acquire Principia Biopharma for an equity value of approximately US$3.68 B (Deal no. 100440).

The level of collaborative R&D dealmaking should remain healthy in H2 2020, although it is unlikely to match the unprecedented levels seen in the first 6 months of the year. Biotech companies with technology platforms that offer multiple shots on goal across multiple indications are likely to fuel more interest than companies with single programs in development. The immuno-inflammation therapy area, for example, is likely to see further high-profile partnering in H2 2020 following Sanofi's US$150 M alliance with Kymera Therapeutics in early July to advance protein degrader therapies targeting IRAK4 in patients with immune-inflammatory diseases (Deal no. 99368).

As products increasingly become pipelines in their own right, big pharma will continue to exercise selectivity in the external assets they choose to access, predominantly seeking best- or first-in-class potential.

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