

Riding the Waves of Health Care Transformation: The Case to Invest

By Leona Yang, CFA

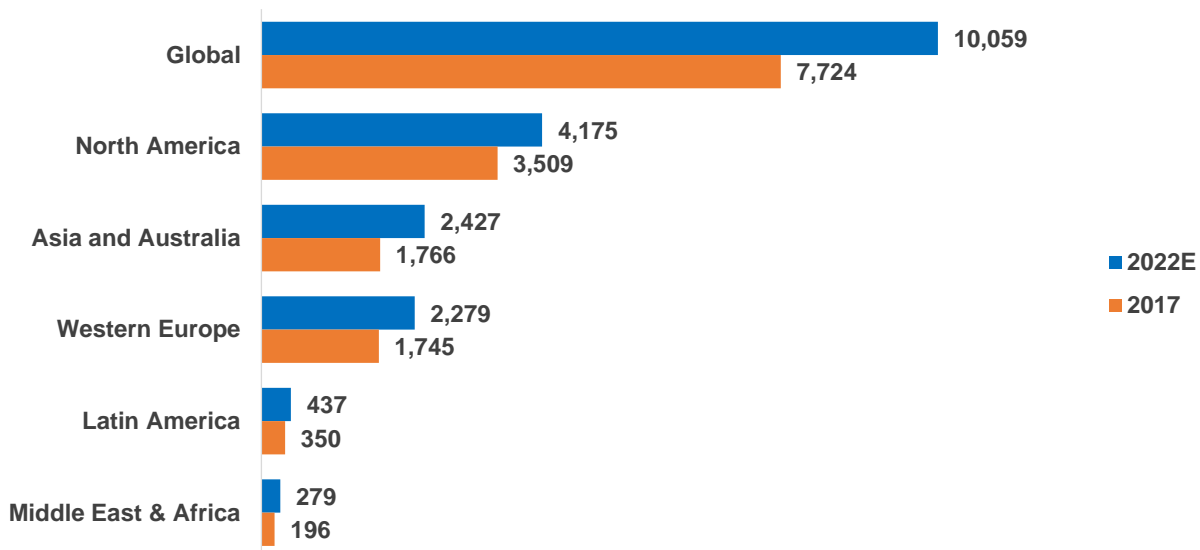
With help from technological advancements, the global health care industry has experienced explosive growth in the past few decades. The impressive progress in health care has had impacts seen worldwide, particularly in terms of increasing life expectancy, reducing infant mortality rates, and improving quality of life measures. While the health care industry benefits from an aging demographic which drives demand for services, the growth in the middle-class in developing countries is also a key growth driver for increased health care demand.

Meanwhile, new and disruptive technologies have brought innovations, and continue to transform the global health care industry. The rate of new drug applications has increased significantly over the past 10 years. However, not all innovations are created equal. The volatile nature associated with high pass-or-fail risk of the sector merits a hedged approach to health care investing.

Health care industry size and projected growth

Global health care expenditures are growing at an accelerated rate. According to the Economist Intelligence Unit, spending is projected to increase at an annual rate of 5.4 percent in 2017-2022, compared to an annual rate of 2.9% in 2013-2017, from USD \$7,724 billion to USD \$10,059 billion.ⁱ

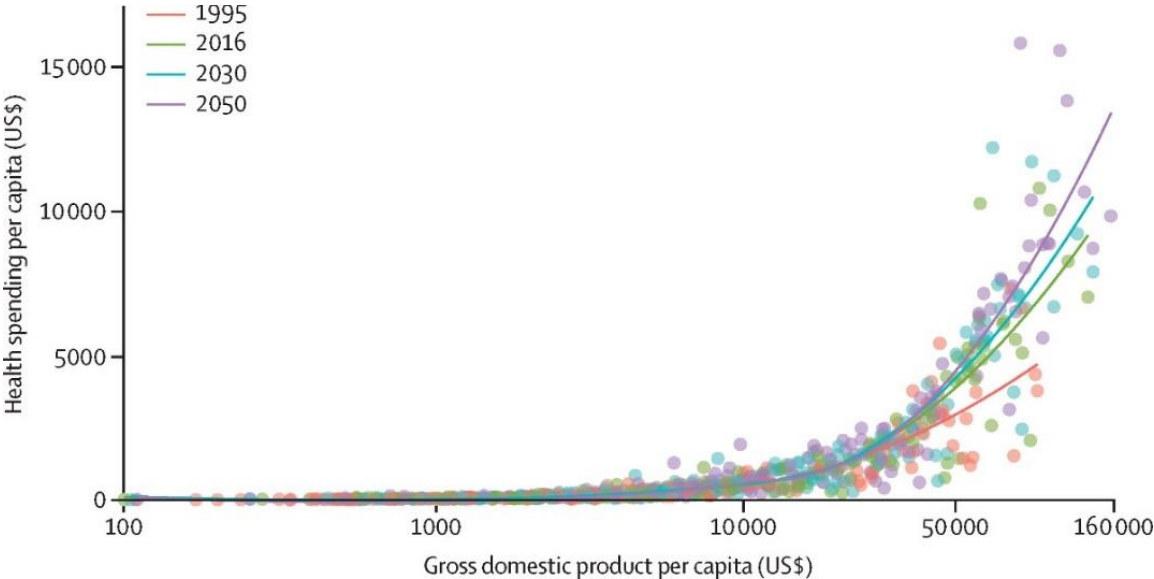
Figure 1: Health care spending (USD billion) 2017 – 2022 (Expected)



Source: Deloitte (2018). 2019 Global health care outlook | Shaping the future

As a percentage of expected GDP per capita, health spending has increased steadily since 1995 and is expected to continue pushing upward. Figure 2 illustrates the results of a study by Global Burden of Disease Health Financing Collaborator Network showing data aggregated from 195 countries and territories, with each dot representing a country-year estimate and the colors representing different years (1995, 2016, 2030, and 2050). The lines are the trend lines reflecting model fit for each year. The steeper future year curves suggest that “countries at the same level of income as other countries in the past tend to spend more on health than those other countries did.”ⁱⁱ For instance, country x with per capita GDP of \$50,000 in 2050 (purple line) is more likely to spend more on health proportionally than country y with per capita GDP of \$50,000 in 1995 (orange line).

Figure 2: Health spending per capita by gross domestic product per capita, for 1995, 2016, 2030, and 2050 (in inflation-adjusted 2018 U.S. dollars)



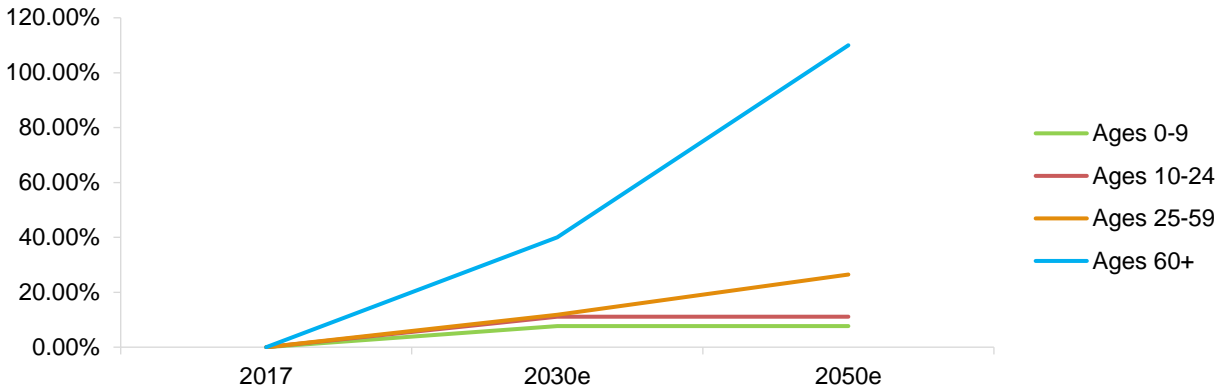
Source: *Global Burden of Disease Health Financing Collaborator Network*

Rising health spending could be attributed to several factors: growing world population, demographics shifting older, as well as innovative and disruptive technologies that have expanded the scope of care to include a vast array of treatments that were not previously available.

Aging population

Over the last few decades, life expectancy has improved significantly around the world. People are generally living longer, and growth in the 60 and over population outpaced all other age groups. It is estimated by the United Nations that between 2017 and 2050, the 60 and over population is expected to grow 110%.

Figure 3: General population expected growth by global broad age group

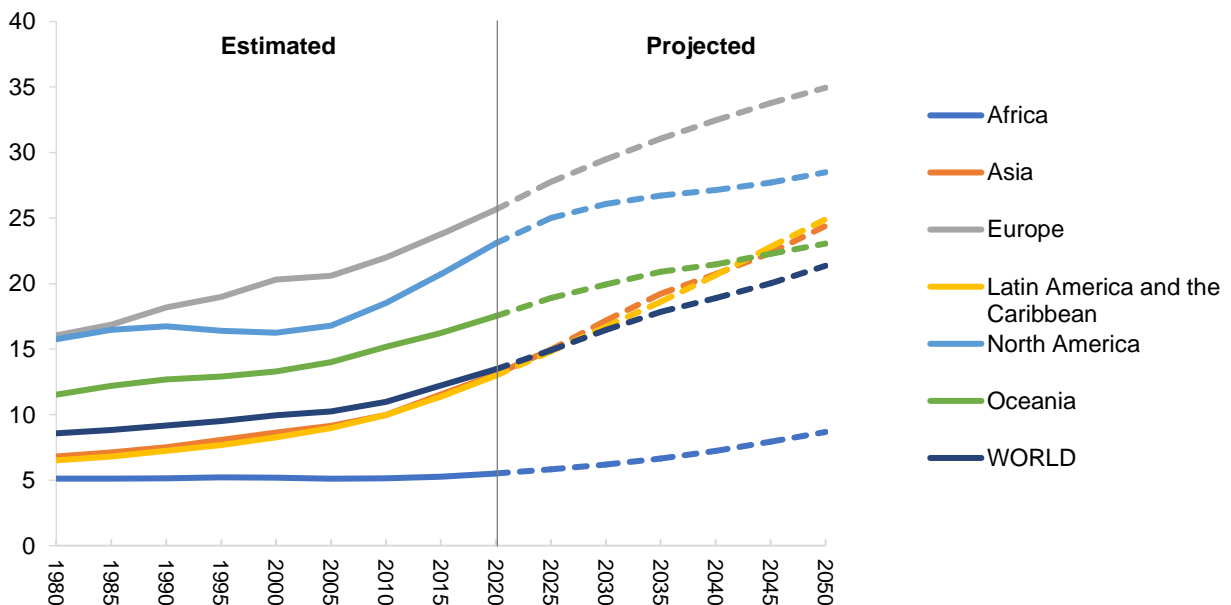


Population (bn)	2017	2030e	2050e
Ages 0-9	1.3	1.4	1.4
Ages 10-24	1.8	2	2
Ages 25-59	3.4	3.8	4.3
Ages 60+	1	1.4	2.1

Source: United Nations

In 2050, one in five persons is expected to be over 60. Regionally, Europe has the highest percentage of population aged over 60 at 35%, followed by North America at 28%, 25% in Latin America and the Caribbean, 24% in Asia, 23% in Oceania and 9% in Africa.ⁱⁱⁱ

Figure 4: Percentage of population aged 60 years or over by region, from 1980 to 2050



Source: United Nation World Population Prospects 2019

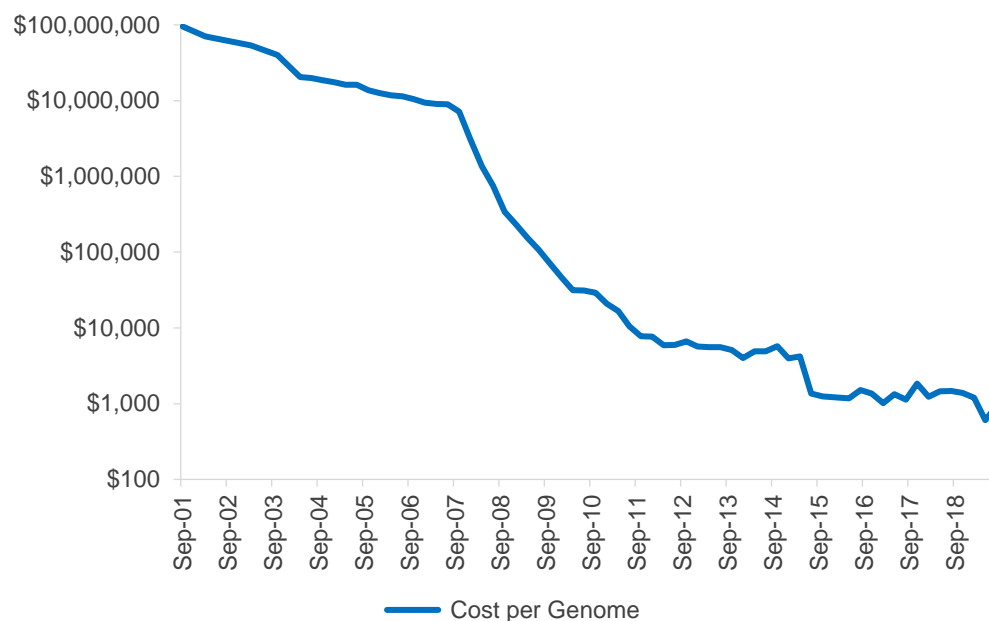
Technology innovations

Technology advancement in the last few decades benefitted the health care industry. The transformation continues as new technologies foster innovations to the industry. Such transformation spans all areas, from new drug development, to new approaches to treat diseases, to new methods for delivering health care with greater efficiency. Key advances include:

I. Human genome project and sequencing technology

The project originally started in 1990, the human genome project (HGP) cost ~ \$3 billion, and took thirteen years to complete^{iv}. With the new sequencing technologies, the cost and time to map a genome has been substantially reduced, and led to a number of advancements in drug development and diagnosis.

Figure 5: Cost per Genome 2001 – 2019



Source: National Human Genome Research Institute (2019), DNA Sequencing Costs: Data

The success in mapping human DNA provides physicians the tools to delve deeper into targeted genomic medicine. A patient's tumor can be analyzed more descriptively, which allows for targeted therapies that address specific mutations (e.g., BRAF-kinase inhibitors for the treatment of melanoma). Treatments can be developed for rare diseases or inherited disorders (e.g., spinal muscular atrophy). New diagnostic approaches, which include both non-invasive screening and tests that provide more effective monitoring of cancerous cells, could potentially improve early cancer detection.

HGP also opened the door for new therapeutic modalities. The most common biological drugs are antibodies—the naturally produced protections from the body's immune system. Genomic medicine allows for creating antibodies that bind to a specific disease's genetic marker, bind and introduce a chemical treatment to fight the foreign substance, or bind to multiple disease targets to allow the

body to flush them out. When natural antibodies are deficient in a patient, genomic medicine can modify them to boost their efficiency. New forms of genetic editing, such as those that focus on the CRISPR sequence in DNA, can correct abnormalities that cause diseases.

As our understanding of the human immune system has increased with the help of genomic medicine, we've seen significant advancements in immunology. A new branch focusing on cancer, Immuno-Oncology, uses advanced biologics to target the immune system at specific cancers. Diseases caused by a dysfunction in the immune system could be treated with genetic corrections, such as the common rheumatoid arthritis to rarer indications like atypical hemolytic anemia.

II. Non-invasive or minimally invasive approaches to treat disease

Medical device companies have pioneered approaches to reduce the number of invasive procedures, promoting faster recovery times and fewer surgical related complications. Transcatheter Aortic Valve Replacements (TAVR) are alternatives to open heart surgery for the replacement of a malfunctioning aortic valve. Patients undergoing a TAVR procedure have shorter hospital stays and lower rates of morbidity and mortality¹. Implantable neuro-stimulators can treat obstructive sleep apnea—a disorder where breathing repeatedly stops and starts during sleep. That new device is far simpler than the current treatment regime of masks and external air pumps, which not only are more cumbersome, but often not even used when needed.

When invasive surgery is necessary, innovative technologies have provided new means to minimize the intrusion and conduct the procedures with greater precision. The first general purpose robotic surgical system was approved in 2000 and have been used millions of times since then². Controlled by surgeon at a nearby console, the robotically-assisted procedure requires fewer and smaller incisions. Over the years, more systems have been developed for more complex and specific needs, such as spine surgery.

III. Changes in health care delivery

The shift from quantity of treatments towards quality of outcomes began before the Affordable Care Act (ACA) in 2010, but the ACA provided greater incentive for healthcare payment reform. In his speeches before health care leaders in 2018, current Health and Human Services (HHS) secretary Alex Azar stated that “There is no turning back to an unsustainable system that pays for procedures rather than value. In fact, the only option is to charge forward, for HHS to take bolder action, and for providers and payers to join with us.”^v Amid this backdrop and help from technology advancement, we have witnessed significant transformations take place in the health care services industry.

The need to shift payment models to value-based care from fee-for-service is well accepted in the industry but a lack of digital health records was a gating factor. While not completely solved because of data interoperability issues, the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 provided funding for hospitals and physician practices to implement electronic medical records. With this base level of digital infrastructure now in place, we are seeing payors shift payment risk to providers.

¹ Arora S, et al. *Circ Cardiovasc Interv.* 2018;doi:10.1161/CIRCINTERVENTIONS.118.006929.

² Alemzadeh, Homa et al. “Adverse Events in Robotic Surgery: A Retrospective Study of 14 Years of FDA Data.” *PloS one* vol. 11,4 e0151470. 20 Apr. 2016, doi:10.1371/journal.pone.0151470

Telemedicine is technology that allows physicians to connect with patients or other physicians from a distance. According to some industry estimates, telemedicine can address 80% of the care provided at the primary care physician's office, 33% of ambulatory care, and 80% of behavioral health visits^{vi}. Telemedicine is often seen as one of the keys to help drive down the health care cost and address the shortage of clinicians. Between 2015 and 2018, the proportion of physicians who have used telemedicine to see patients increased from 5% to 22%^{vii}.

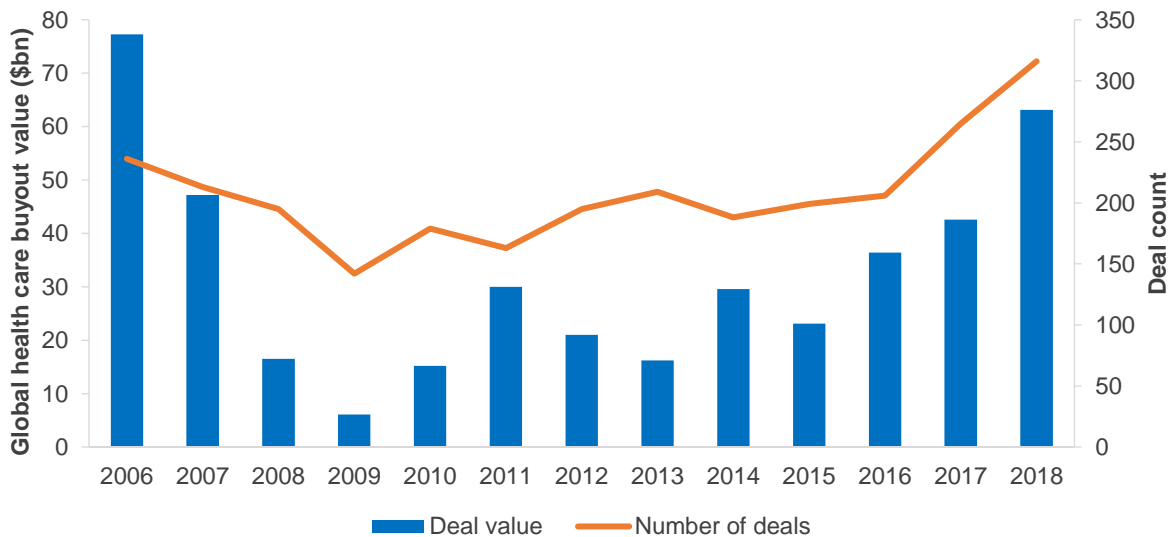
Recent innovations enable clinicians to monitor patients remotely and outside of conventional clinical settings. This service helps providers better track health and medical data after a patient is released, which could potentially reduce readmission rates. The global remote patient market is expected to accelerate at annual growth rate of almost 16% from 2018 to 2022^{viii}. We expect artificial intelligence to be key in processing the proliferation of data being generated by remote monitoring devices.

Innovations have transformed many clinical procedures that used require inpatient stays to be safely performed in an outpatient setting. According to the 2019 American Hospital Association survey, the gap between revenues from inpatient and outpatient continues to shrink, with outpatient net revenue close to surpassing inpatient net revenue^{ix}.

Growth in the number of health care industry mergers, acquisitions, and offerings

Health care includes a wide range of industries and offers opportunities that have historically attracted long-term investors. With tremendous innovations, the sector continues to offer compelling reasons for investment. Most recently, despite broad market volatility in fourth quarter 2018, the industry attracted investors at record levels, with both deal activity and disclosed value reaching their highest level since 2006.^x

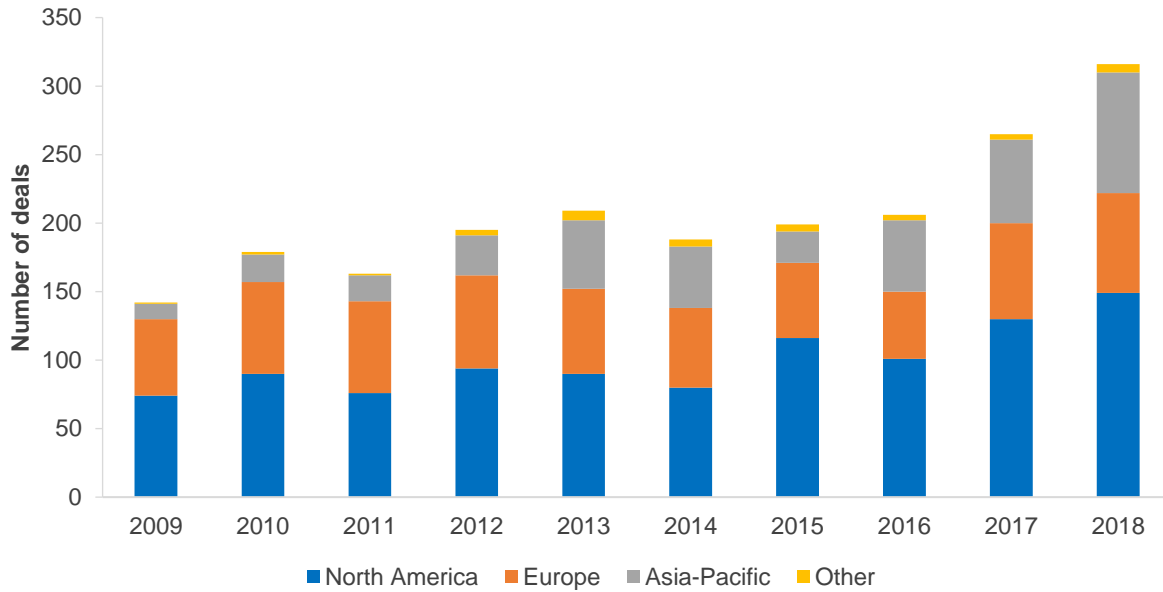
Figure 6: Global Health Care Buyout Deal



Source: Bain & Company (2019). Global Health Care Private Equity and Corporate M&A Report 2019

Among these deals, North America and Asia-Pacific showed the largest increases in 2018, while deal volume remained stable in Europe.

Figure 7: Global Health Care Buyout Deal Volume by Region

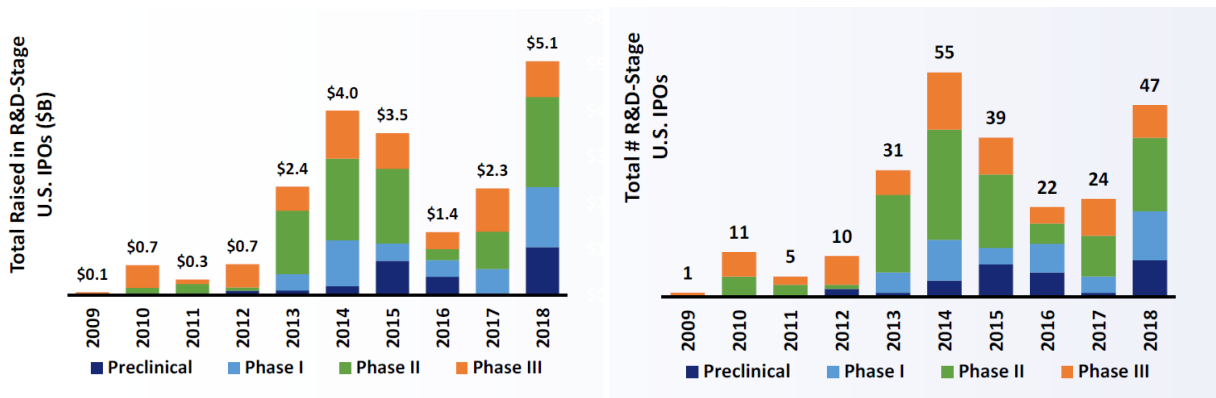


Source: Bain & Company (2019). Global Health Care Private Equity and Corporate M&A Report 2019

With opportunities come risks

Meanwhile, more biotech companies are going public with little or no clinical data. In 2018, the average amount raised per IPO for preclinical stage companies was \$108 million, the highest amount seen over the past decade.^{xi}

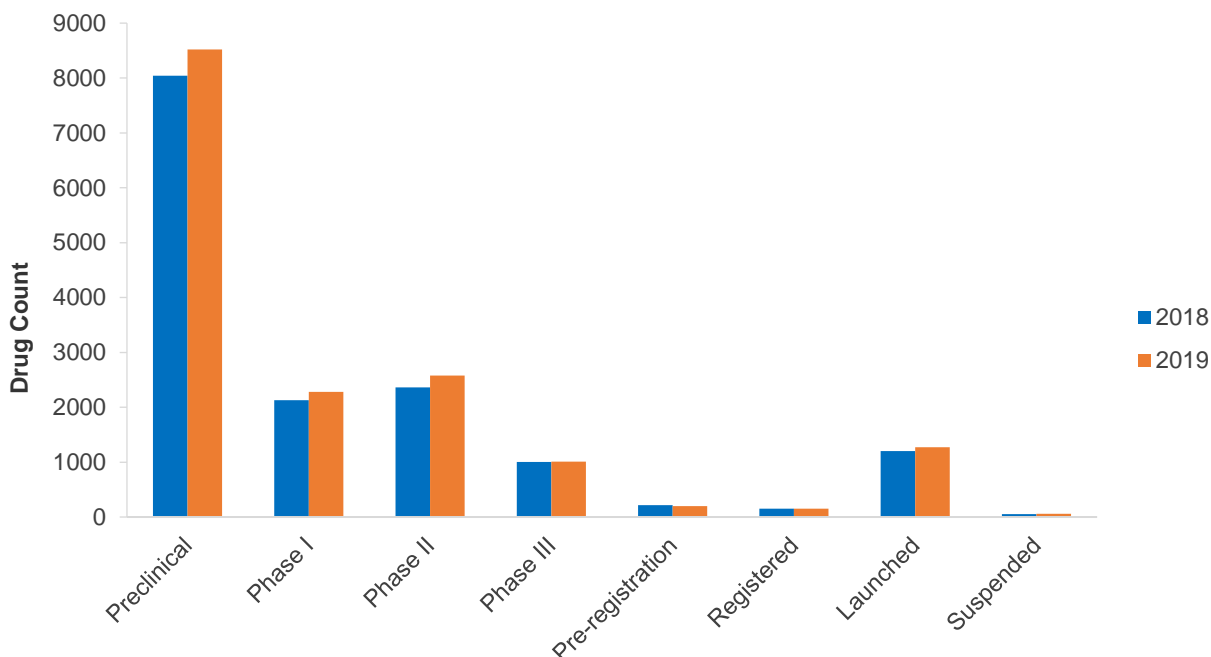
Figure 8: IPOs for U.S. R&D-Stage Therapeutic Companies, 2009 – 2018



Source: Bio Industry Analysis (2019). 2019 Emerging Therapeutic Company Trend Report

As companies continue their journeys from pre-clinical to the finish line, many fail along the way. As illustrated in the figure below, the number of drugs drop significantly from preclinical to phase I^{xii}.

Figure 8: Pipeline by development phase, 2018 and 2019



Source: Pharmaprojects®, January 2019

According to a study based on data from 2000 to 2015 by researchers at MIT, nearly 14% of all drugs in clinical trials ultimately win approval from the FDA. The approval rates vary greatly for specific illness, ranging from a high of 34% for infectious-disease vaccines to a low of 3.4% for cancer^{xiii}.

The case to invest

Innovations of the past few decades have changed the landscape of the health care industry, as we have witnessed explosive growth in the space. With this development, the weight of health care sector within major indices has also increased over time. We expect technological improvements will continue to transform the industry and at an accelerated pace. Meanwhile, there will be opportunities for investors to get involved and be at the forefront of the wave of transformation. In order to take advantage of the full opportunity set, we believe it would be prudent to allow flexibility to invest in both public and private markets, across the full market cap spectrum to capitalize on opportunities in the global space. From a tactical point of view, recent volatility has created an attractive entry point into the sector.

Health care is a highly specialized area, which we believe requires not only significant experience on the investment side but also deep knowledge of and keen insight into the industry. Health care can be a volatile sector with high binary risk associated with clinical trials and ultimate drug approval, which makes disciplined risk management of great importance.

Endnotes

- ⁱ Deloitte (2018). *2019 Global health care outlook | Shaping the future*
- ⁱⁱ Chang AY, et al. Past, present, and future of global health financing: a review of development assistance, government, out-of-pocket, and other private spending on health for 195 countries, 1995-2050 *Lancet*: 25 Apr 2019. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(19\)30841-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30841-4/fulltext)
- ⁱⁱⁱ United Nations (2019). *World Population Prospects: the 2019 Revision*
- ^{iv} National Human Genome Research Institute
- ^v Remarks on Value-Based Transformation to the Federation of American Hospitals, Alex M. Azar II, Federation of American Hospitals, March 5, 2018
- ^{vi} Teledoc Health company data
- ^{vii} American Well (2019). *Telehealth Index: 2019 Physician Survey*
- ^{viii} Technavio (2019). *Global Remote Patient Monitoring Market 2018 – 2022*
- ^{ix} Deloitte (2019). *Growth in outpatient care |The role of quality and value incentives*
- ^x Bain & Company (2019). *Global Health Care Private Equity and Corporate M&A Report 2019*
- ^{xi} Bio Industry Analysis (2019). *2019 Emerging Therapeutic Company Trend Report*
- ^{xii} Pharmaprojects (2019). *Pharma R&D Annual Review 2019*
- ^{xiii} Wong, Chi Heem, et al. "Estimation of Clinical Trial Success Rates and Related Parameters." *Biostatistics*, vol. 20, no. 2, 2018, pp. 273–286., doi:10.1093/biostatistics/kxx069.

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