



Advisor Education Series

The Disruption in Healthcare Investing 2020

Healthcare is being disrupted... and we're just getting started. The healthcare sector should continue to be one of the most dynamic investment sectors in the world economy. We have identified several long-term trends in the new healthcare economy.



Long Term Trends in the new Healthcare Economy



1 – Digital technology adoption for diagnosis, monitoring, and alerts, all supported by AI analytics and personal care management

- Started with telehealth but is expanding to passive real time monitoring of patients with chronic disease. Now expanding to digital drugs (therapeutics). Tip of the iceberg as healthcare goes digital.
- Digital Health – Still way too much valuable information is trapped within the silos of healthcare that would provide critical insights on improving outcomes for specific patients while improving the overall efficiency of the healthcare workflow.
- AI & Robotics – Arguably, the biggest single growth opportunity in healthcare over the next 10 years. Medical AI is getting better (smarter) but we still lack evidence based studies. Other opportunities are in AI to improve administrative cost in healthcare.



2 – Focus on proactive well care vs. a reactive sick care centric model



3 – Virtual care and retail health clinics becoming mainstream as lower-cost, more-preferred access points



4 – Precision medicine targeting the unique genetics of each individual

- 40% of all FDA-submitted new drug applications have a companion diagnostic to ensure the patient has the correct genetic biomarker to ensure optimal outcomes and lower overall costs.
- Gene therapy, CRISPR, and Cell Therapy are all new key precision med technologies.



5 – Rising consumerism and patient engagement empower patients to make more efficient healthcare decisions

- Consumers are paying more and expecting more – more in terms of improved access points to healthcare (retail clinics, virtual physician visits) at lower cost. The next consumer wave will be increased transparency on quality and cost.



6 – Convergence of Medical with Social Needs

- Social determinants of health such as poor food security, dietary habits, lack of transportation, and vulnerable housing are increasingly being recognized as major drivers of excessive healthcare costs. There is a big opportunity for innovators who can solve at scale.
- Strategic Implications from the Novel Coronavirus on the Healthcare industry – From easing regulations to digital health acceleration to shifting preferences to site of care, there will be a new normal across the healthcare complex post the pandemic.

Two Healthcare Systems... But Moving Toward a More Viable Third Approach, System C



A – Expensive and Unmanaged (1980-1998)

- Misaligned incentives that shielded patients from the true cost of care.
- Providers incentivized to provide as much medical care as reasonably possible, regardless if it was unnecessary or inefficient. Even better, if physicians could refer their patients to lab or surgery center owned by the physician.
- Drug manufacturers price drugs with little to no pushback. Pharmacy benefit managers were mainly claims procession and mail pharmacy hubs.



B – Putin Meets Castro (1998-2018)

- Health plans excessive use of prior authorization, restricted networks, and narrow drug formularies alienated consumers and aggravated providers while shifting more of the healthcare cost burden to individuals.
- Deductibles are now greater than life savings for 50% of the privately insured.
- Cost of cancer therapy rises from \$12K/year to \$12K/month, bankrupting 10% of treated patients who can't afford the massive cost of cancer drug therapy.
- Physicians overly burdened by electronic medical record systems that are clunky, not integrated, and still require lots of manual documentation.



C – The New Connected Health Economy (2019-2030)

- Digital technology adoption for diagnosis, monitoring, and alerts – all supported by AI analytics and personal care management. Google, Apple, and Amazon are all angling to facilitate this digital thrust
- Focus on well-care away from a sick-care centric model – Proactive vs Reactive
- Virtual care and retail health clinics becoming mainstream as lower-cost, more-preferred access points
- Precision medicine targeting the unique genetics of each individual – designer drugs
- Rising consumerism and patient engagement empower patients to make more efficient healthcare decisions

Shifts Driving to System C

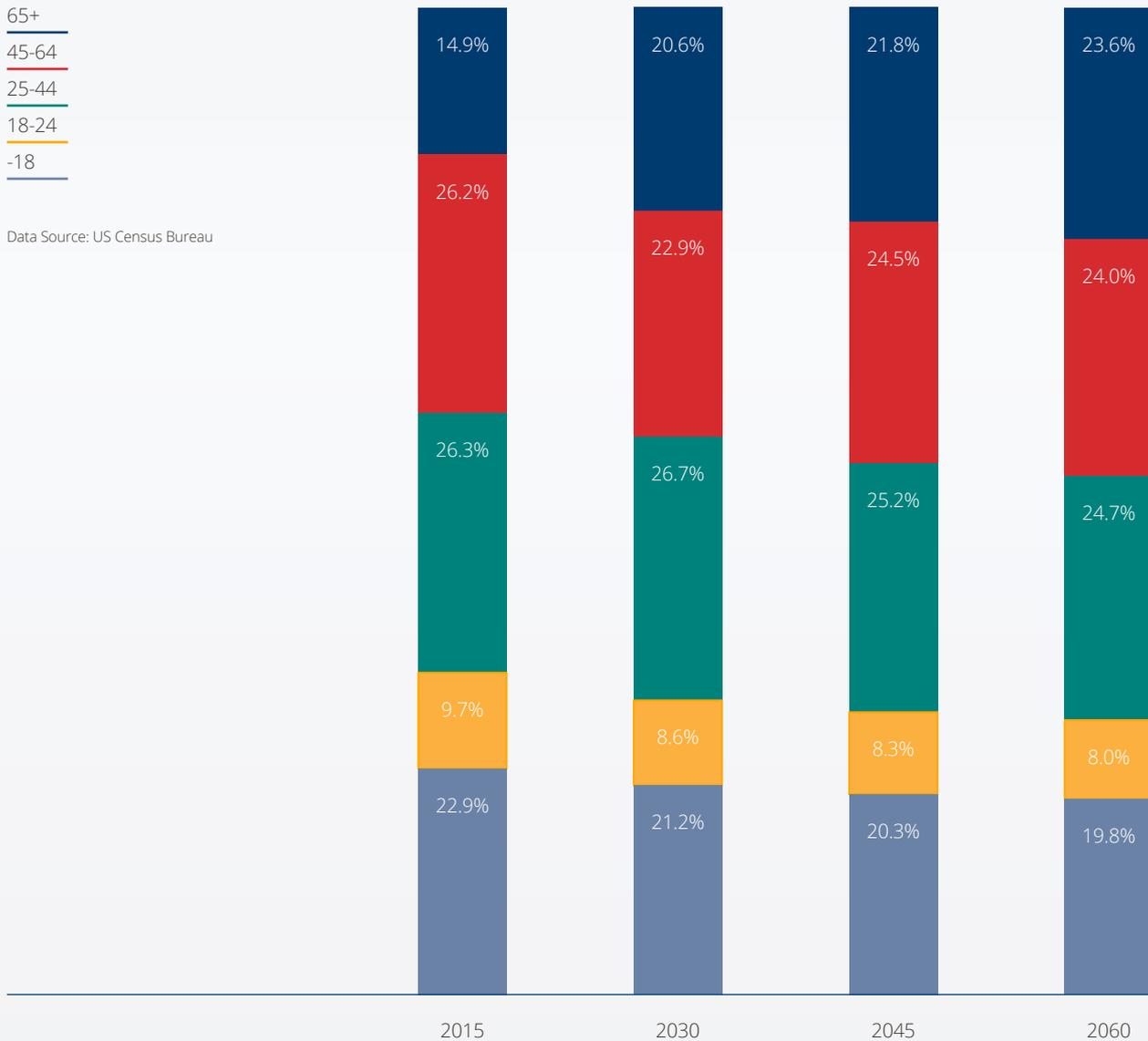


Demographic Changes

The thrust in the over 65 population means a stair-step increase in the prevalence of chronic disease and logarithmic increase in per capita healthcare costs. For instance, the top 5% of healthcare utilizers over 65 years of age account for 33% of all the U.S. healthcare spending. The top 15% of those over 65 account for 61% of all U.S. healthcare spending.

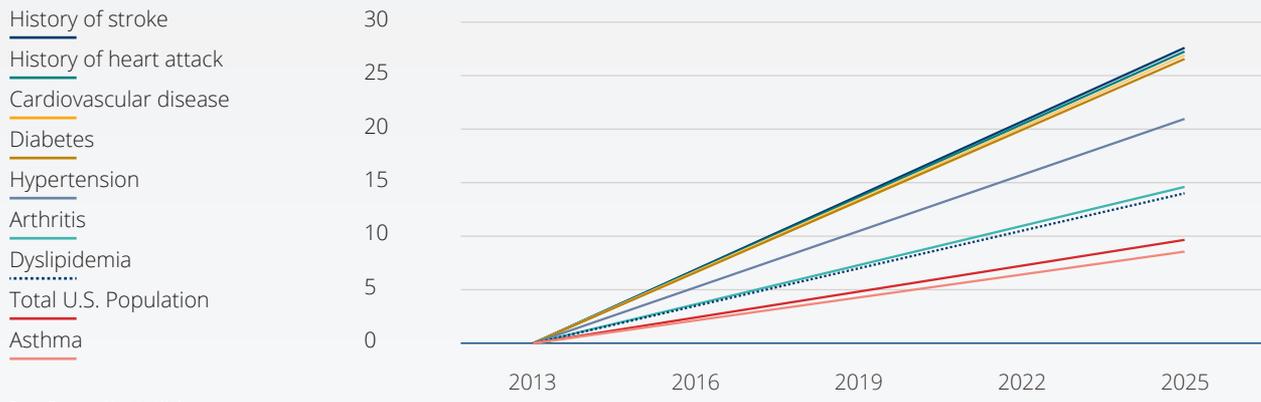
US Population Projections, by Age Group

Share of total population, by age bracket | 2015-2060



Accelerating Chronic Disease Prevalence – 77% of those over 65 have at least two different chronic conditions. Heart disease, stroke, cancer and diabetes cause nearly 70% of all deaths every year.

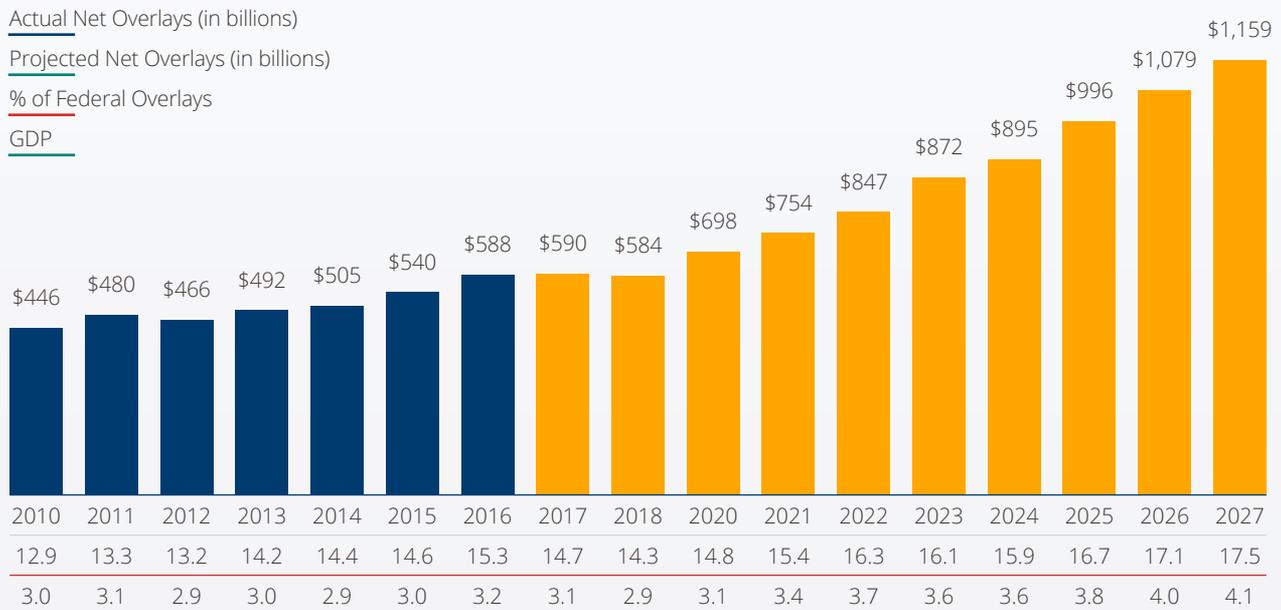
Percentage Growth in Chronic Diseases



Data Source: HealthAffairs.org

The cost implications for accelerating Medicare spending create significant societal and financial impediments if left unabated. The time for more effective and holistic healthcare improvements has never been more important. Sometimes it pays to panic... we're close to this point.

Actual and Projected Net Medicare Spending, 2010-2027



Note: All amounts are federal fiscal years; amounts are in billions and consist of mandatory Medicare spending minus income from premiums and other offsetting receipts.

Data Source: Congressional Budget Office, An Update to the Budget and Economic Outlook, 2017 - 2027 (June 2017).

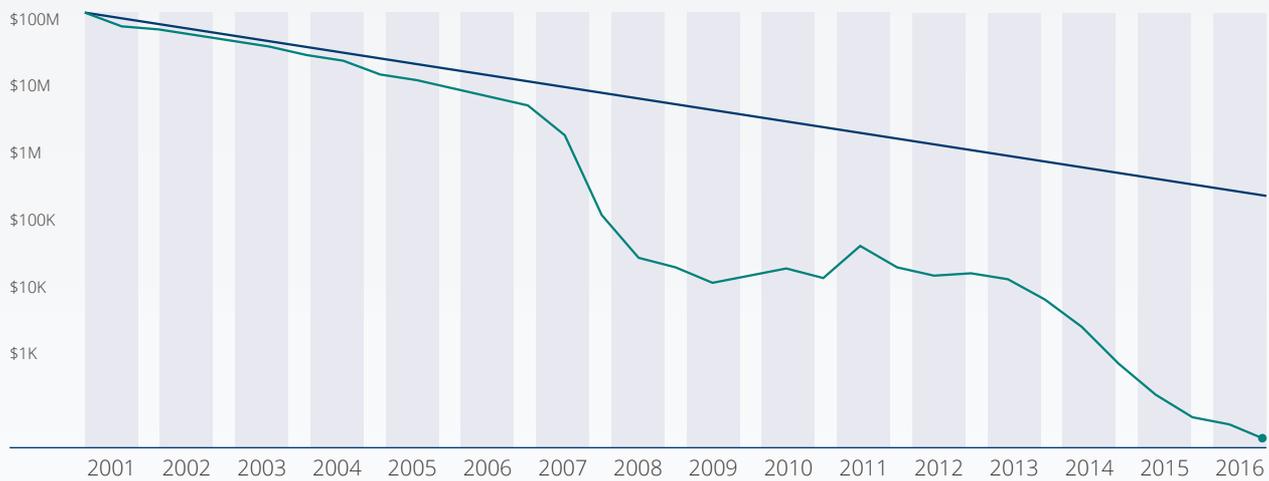
Transformative Technology

Defying Moore's Law on the Road to Precision Medicine – The stunning inroads the role technology innovation has played in lowering the cost of acquiring a human's sequenced DNA is the biggest turning point over the last 20 years in healthcare. There is now a visible pathway to a \$100 genome over the next three to four years.

Cost per Genome

Share of total population, by age bracket | 2015-2060

Moore's Law Forecast
Historical Rate



Data Source: National Human Genome Research Institute

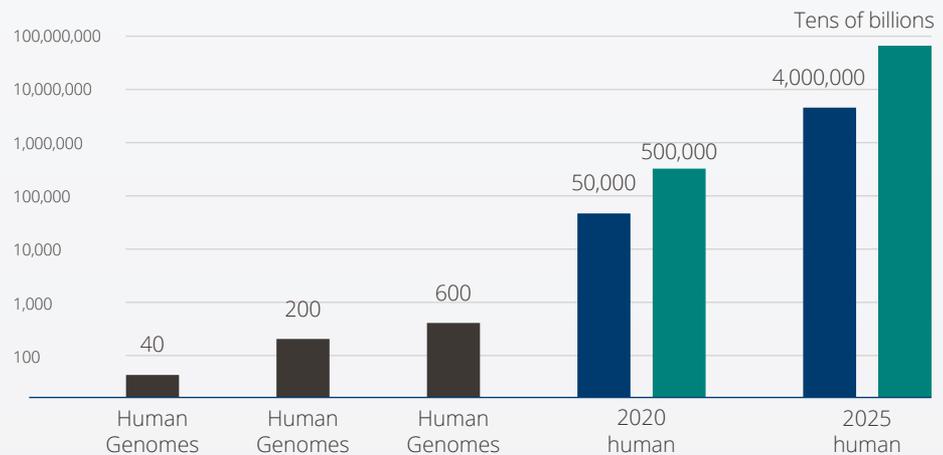
Increased sequencing of the human genome has led to rapidly acquiring more relevant information about both the underlying cause and potential treatments of chronic and rare diseases

The tip of the spear to a proactive rather than reactive healthcare system

Moore's Law Forecast
Historical Rate Forecast

Note: Amounts in Thousands

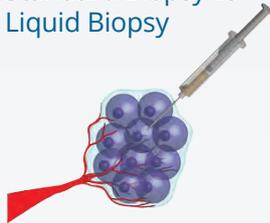
Data Source: NIH National Human Genome Research Institute



Game-changing breakthrough technology – from gene therapy to CRISPR DNA editing drug platform to real time wireless glucose monitoring and more accurate Afib detection – is causing a tidal shift in healthcare practices.

- For example, the standard biopsy procedure for detecting tumors and cancer is being replaced with a liquid biopsy procedure, dramatically increasing the survival chance with early detection.

Standard Biopsy vs Liquid Biopsy



Time-Intensive Procedure
Localized Sampling of Tissue
Not Easily Obtained
Some Pain/Risk
Invasive

Quick
Comprehensive Tissue Profile
Easily Obtained
Minimal Pain/Risk
Minimally Invasive

The digitalization of healthcare will further revolutionize care delivery in the next 5 years and at an accelerating rate. Venture capital firms are chasing the opportunity with multiple business models across various healthcare channels.

The Digital Hospital: 82 Companies Reinventing the Practice of Medicine



Payers getting into the digital game enhances the patient experience, while lowering medical spend. Technology in healthcare has become deflationary... finally.

Examples:

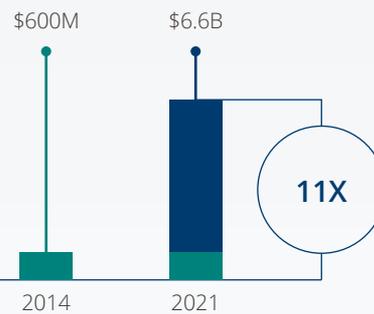
- Apple & Aetna recently teamed up on a new app to track and reward healthy behavior -- they worked together on an iPhone and Apple Watch app that offers rewards, including an option to earn a free Apple Watch, to members who get regular exercise and better sleep.
- Health insurers aren't known for their consumer-friendly design. Health insurer Anthem has hired a cluster of Apple employees to help it modernize.

AI and machine learning growing with the speed of Superman... Investors Following

The AI health market is seeing explosive growth.

Health AI Market Size 2014-2020

Acquisitions of AI startups are rapidly increasing while the health AI market is set to register an explosive CAGR of 40% through 2021



AI in Healthcare Funding Reaches a New Height in Q3'19

VC-backed deals and financing to healthcare AI startups, Q1'18 - Q3'19

Amount (\$M)
Deals

Data Source: CB INSIGHTS



AI and machine learning algorithms add to diagnostic and prognostic accuracy while finding earlier stage occurrences, facilitating more proactive treatment options.

MIT/Harvard Experiment

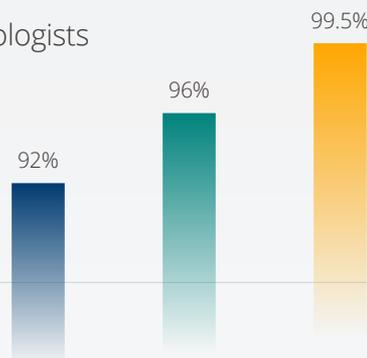
Identifying Cancer: Artificial Intelligence vs. Pathologists

AI Alone

Pathologists Alone

Pathologists Supported by AI

Data Source: CB INSIGHTS



Google's Algorithms are Matching Doctors

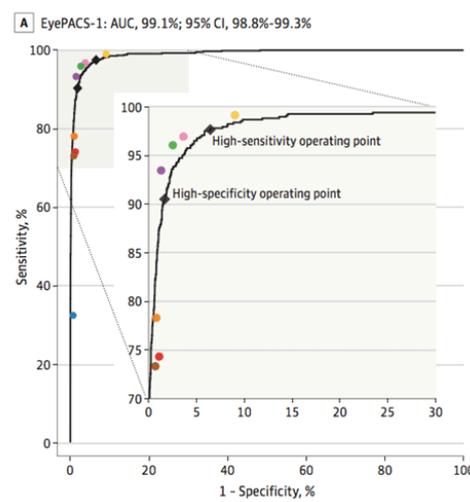
In early research, Google proved its algorithms were equally as good as trained ophthalmologists in detecting diabetic retinopathy (a condition when high sugar levels cause damage to blood vessel in the eye).



Google Research Blog

"The results show that our algorithm's performance is on-par with that of ophthalmologists."

Performance of the algorithm (black curve) and eight ophthalmologists (colored dots) for the presence of referable diabetic retinopathy based on 9,000+ images.



Unprecedented Social Transition



Millennials are changing both the world and healthcare. Their attitudes are driving massive change... much of it for the better.

- Millennial and Gen Xers are accustomed to acquiring goods and services from any device
- More involved in selecting their health plans via exchanges

Healthcare Consumerism as a Major Change Agent

- Consumers are spending an average of \$2600/Year/Person on their healthcare via high deductible health plans
- Seniors actively shop and compare on Medicare Advantage and Part D Rx plans

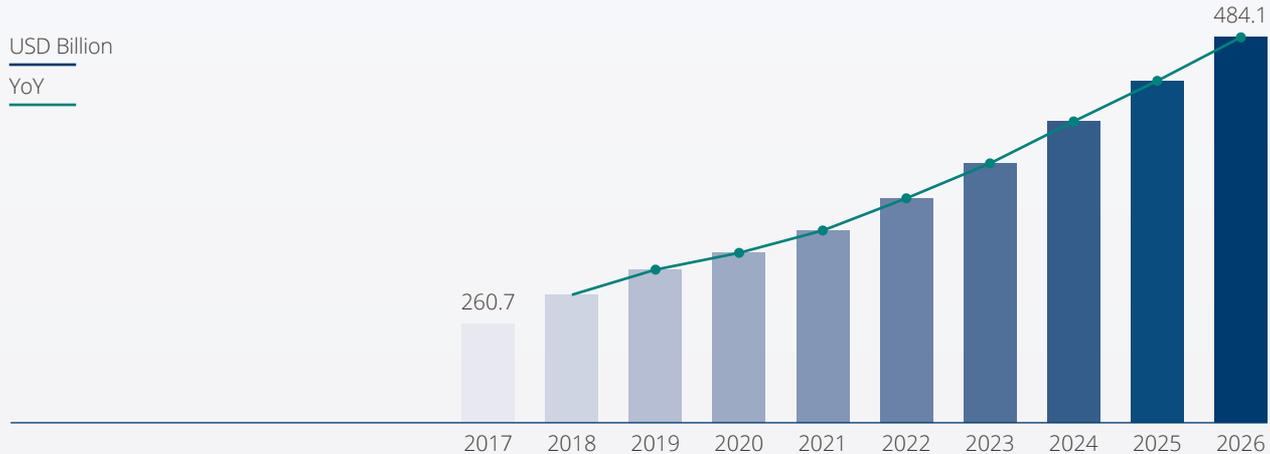
Retailization of Healthcare

- 3000 retail walk-in clinics are now open today versus 250 in 2006 – driven by CVS, Walgreen’s, and now Walmart
- Services expanding from physician assistant diagnosing and writing a prescription to now performing lab tests
- Dramatically more convenient and lower cost for the patient and healthcare system

The Rise in Home Healthcare

The activist healthcare consumer isn't just wanting more convenient access points to care... they're demanding it be delivered to their home and payers are enabling.

Home Healthcare Market (USD Billion) & YoY Growth %



Data Source: CB INSIGHTS

Emerging Healthcare Themes Stemming from the COVID-19 Pandemic

Regulatory Restrictions Have Eased – Both the FDA and the Centers for Medicare and Medicaid Services have modified existing regulatory pathways to ensure needed drugs and technologies are made available under emergency use authorizations. The key benefit has been a faster adoption curve for new novel technologies and in some cases, re-purposed medicines such as Remdisivir, an off the shelf antiviral. We expect this sort of accelerated regulatory flexibility to continue for novel diagnostics and therapeutics in the future.

U.S. Government Investment in Public Health Could Double Next Five Years – The U.S. currently spends 4% of Gross Domestic Product (GDP) on public health. This compares with an average of 10% to 12% of GDP in developed countries. With the disparity in COVID-19 outcomes in the U.S. disproportionately impacting lower income individuals, the U.S. will need to accelerate its investment in public health closer to those of other developed countries to eliminate the ongoing burden on higher co-morbidities (diabetes, obesity, heart disease) to democratize access to higher quality healthcare.

Use of Telemedicine Has Been Pulled Forward by Three Years as a Result of COVID-19 – What took six years to make online virtual visits 8% of the primary care physician/patient market more than tripled over a short few months since COVID-19 made its way to the U.S. This powerful shift to a lower-cost, more convenient physician visit will not revert to pre-COVID-19 level, as we expect a more normalized 15% to 20% of all physician visits to remain virtual (online) in a post-pandemic environment. Not only has the telemedicine penetration exploded since March but its broad use is occurring outside of primary care to significant adoption by specialists for their patients. Nothing personifies the new connected healthcare world more than having access to a physician visit anytime and anyplace 24/7.

Onshoring of Pharmaceutical and Bio Manufacturing/Supply Chain – In light of the on-going trade tariffs and nationalism themes emerging across the globe, we expect governments to be more proactive about ensuring adequate access to critical drugs and healthcare supplies. Shortages in personal protective equipment (PPE), ventilators, and some key pharmaceutical ingredients will result in some governments legislating or strongly incentivizing companies to manufacture products in their home countries. In fact, in March a bill was introduced in the U.S. Congress to require drug companies to provide the FDA with more information regarding their active pharmaceutical ingredient. In the meantime, expect governments around the world to stockpile medicines and medical equipment essential in a health crisis for their own population.

Shift in Site of Care Away from Long Term Care and Hospital Facilities – A number of deaths from COVID-19 occurred in assisted living and long term facilities where individuals who were at unusually high risk of infection were all clustered in the same facility. While there had already been shifts underway toward more use of home health and use of free-standing ambulatory surgery centers (ASCs), the pandemic only accelerates those movements.

As remote patient monitoring, via digital health devices, become more mainstream, its clear patients (and their families) will more closely evaluate age at home options than in a facility-based environment as in the past. Home nursing and custodial care will likely see big spikes in demand as they enable a more comfortable and safer environment for those needing assisted living or skilled nursing capabilities.

Along the same lines, we anticipate more knee and hip replacement procedures to be performed in ASCs, rather than hospitals, where patients feel more secure about having an elective surgical procedure away from ICUs with COVID-19 patients. Furthermore, surgeons who were prohibited from performing surgical procedures in hospitals in March and April will likely have more flexibility to perform those within an ASC in the future, while following stringent infection control procedures. Albeit, there are some reimbursement issues that need to be resolved prior to making those orthopedic procedures within an ASC, the emerging standard of care site location.

Related to the Shifting Sites of Care Outside of Hospitals, Expect Hospital Consolidation and Closings To Rise – Close to 1/3 of all U.S. hospitals are believed to have less than six months of cash available... a corollary of high costs of ICU patients and the elimination of the high margin elective surgeries for nearly three months.

During the peak of the pandemic in March and April one could not miss seeing Mt. Sinai Health system (one of the largest medical systems in the country) run fundraising solicitations in national TV spots. While the financial condition of the largest and most well-run facilities has improved since May, coinciding with the commencement of elective surgeries, many other hospitals who were struggling or heading toward the edge will simply not recover. It is plausible that 25% of all hospitals operating today will either be acquired or closed as we exit the pandemic over the next one to three years. Loss of surgery volumes needed for higher inventory levels, resulting in credit downgrades or simply the dynamic of people moving out of the urban core will leave too much available hospital capacity.



Our Take Home Thought:

Every healthcare organization needs to view themselves as a technology company in the new connected healthcare economy, not just as something they need to have!

The Buffalo Funds Approach to Healthcare Investing For System C

We Focus on Six Key Attributes with Investments:

- 1 – **Technical Excellence** – Does the technology have the potential to be 3-4 times greater than the current standard of care and does the company have a rock solid engineering/R&D team.
- 2 – **Outstanding Leadership** – An exceptional operating team with a unique vision about changing healthcare in a durable way. Best teams have a track record of delivering consistent operating excellence.
- 3 – **Strategic Focus on a Large Market** – Not interested in bite sized opportunities but want to ensure companies are going after markets large enough that would allow them to become both relevant and a really important contributor to our healthcare system.
- 4 – **Reasonable Approach to Financing** – Don't want companies that will be required to raise too much money or that desire or may be forced to raise too little.
- 5 – **Possesses a Sense of Urgency** – Technology cycles become obsolete faster than ever. It's imperative to capitalize on opportunities quickly but smartly. Having a sense of urgency to maintain the technology edge and capture the growing market opportunity is critical.
- 6 – **A Strong Focus on Culture** – Other than hiring the right people, having the right culture is critically important to overcoming significant challenges and creating a great team that is ethical, respectful, and honest. An aspiring culture in any size company is essential to being successful.

About the Author



Ken Laudan, Portfolio Manager

Ken joined the Buffalo Funds in 2020 as a portfolio manager and has 27 years of professional investment experience. Ken's previous positions have included roles as healthcare investment advisor at Friess Associates, Managing Director at SunTrust Robinson, George K. Baum & Company, and Hambrecht & Quist, as well as Principal for Montgomery Securities. At the Buffalo Funds, Ken works with growth equity portfolios, and his focus is on companies in all market sectors, with additional expertise in the healthcare sector. Ken received a B.S. in Finance from Kansas State University.

Interested in More Information?

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DEFINITIONS & DISCLOSURES

Opinions expressed are subject to change at any time, are not guaranteed, and should not be considered investment advice. CAGR stands for compound annual growth rate. YoY stands for year over year. As of 3/31/20 Google (Alphabet A/C shares), Apple, and Amazon were owned by the Buffalo Dividend Focus Fund (1.17%/1.13%, 3.63%, 1.66%), Growth Fund (3.23%/2.89%, 2.56%, 4.85%), and Large Cap Fund (4.52%/1.83%, 4.52%, 6.62%). Anthem was owned by the Buffalo Dividend Focus Fund (1.18%). No fund owned Aetna.

Mutual fund investing involves risk; Principal loss is possible. The Funds may invest in smaller companies, which involve additional risks such as limited liquidity and greater volatility than larger companies. The Funds may invest in foreign securities which will involve political, economic and currency risks, greater volatility and differences in accounting methods. This risk is greater in emerging markets. The Funds may invest in lower-rated and non-rated securities which presents a greater risk of loss to principal and interest than higher-rated securities. Investments in debt securities typically decrease in value when interest rates rise. This risk is usually greater for longer-term debt securities.

The Funds' investment objectives, risks, charges, and expenses must be considered carefully before investing. The summary and statutory prospectuses contain this and other important information about the investment company and may be obtained by calling (800) 49-BUFFALO or visiting buffalofunds.com. Read carefully before investing.

Kornitzer Capital Management is the advisor to the Buffalo Funds, which are distributed by Quasar Distributors, LLC.

About Buffalo Funds

The Buffalo Funds are a family of 10 no-load, actively-managed mutual funds offering a variety of domestic equity, international equity, and income-generating investment strategies. We believe patient investing, backed by solid intelligent research, is the best way to achieve potential long-term financial rewards. Disciplined investment decisions are made using a distinct, time-tested investment approach guided by trend analysis, rigorous fundamental company research, and strict security valuation parameters.

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