OLIVER WYMAN

FUTURE TRUTHS

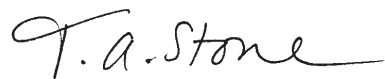Health Innovation Journal | Volume 4

INTRODUCTION

Welcome to the fourth edition of our Journal, which we're delighted to release at this year's virtual Health Innovation Summit. This collection of articles reflects the latest perspectives from thought leaders within our Health and Life Sciences practice and beyond, all at the frontlines of industry-wide transformation. This year is a turning point for our lives. This journal highlights bold ideas we believe will become reality given the current innovation trajectory— one shaped by both unexpected solutions born from an unprecedented crisis as well as fundamental shifts well underway.

We strive to create a healthcare system based on flexibility amidst rapidly evolving consumer needs and wants, where technology supports and supplements medical decisions, where home health becomes the default, and where healthcare available where you are, when you want it, becomes mainstream. Our 2020 *Health Innovation Journal* aims to dive into some of the greatest future truths of tomorrow (as our Summit theme captures) to help leaders predict how different industry sectors must adapt in time.

You'll find articles across a plethora of topics, including: care access, supply and demand, the future workforce, genomics, and artificial intelligence. Our hope is these perspectives will shape tomorrow's leading innovations and spark new ideas in the minds of you — our community — who is driving them.

Warm regards,

T. A. Stone

Terry Stone

Managing Partner, Health and Life Sciences, and Global Chair for Inclusion & Diversity, Oliver Wyman

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UNPREDICTABILITY PRESSES ON. SO DO WE.

By any measure, 2020 has been a year that history will not forget. The COVID-19 pandemic — which, as of this writing, has sickened over 37 million individuals worldwide and resulted in more than 1 million deaths — has completely transformed our economies and societies. Climate change made headlines, from the wildfires in Australia and the Western US to the floods in Louisiana. Every continent has experienced increasing political polarization and calls to action on racial and ethnic inequities. The economy has also been a story of the haves and have-nots, with the stock markets experiencing historic highs in a context of (also-historic) unemployment.

The healthcare industry has been a main player in this story, both leading the front-lines of the COVID-19 response and having to quickly address changing consumer preferences and economic realities. In fact, at the outset of the COVID-19 pandemic, there was doubt about whether anyone in the industry would survive intact. Images of constrained intensive care unit (ICU) wards flooded news feeds, providers experienced near-total reduction in elective volume, pharmaceutical conferences were deemed super-spreader events, and payers had no idea what impact COVID-19 would have on medical claims.

In the face of these challenges, the industry mobilized and adapted quickly. Health systems went from near zero to thousands of virtual health visits in the course of a week. Payers suspended utilization management programs, moved entire operations to virtual, and provided loans to help their provider partners manage cash flow changes. Biopharmaceutical organizations rushed to develop vaccines, with 92 candidates currently in clinical trials. Suddenly, the unthinkable became commonplace.

As sudden as this change may have appeared to others, we in the industry were not surprised: The events of the last year just served to catalyze shifts that were already reshaping the market. Across the world, the population is getting older: In 2018, for the first time in history, persons aged 65 or above outnumbered children under five, increasing government spend on healthcare across the globe. The ways individuals receive care are also changing. In the United States, the national market size of the

Suddenly the unthinkable became commonplace

telehealth services industry [jumped by over 30 percent](#) each year between 2015 and 2020; and last year was the sixth year in a row that [11 personalized medicines were approved](#) — this is more than 20 percent of newly approved therapeutic molecular entities. The market interest in healthcare innovation has also increased, with total health innovation funding in the first half of 2020 [topping $9 billion](#) — a nearly 19 percent jump compared to $7.7 billion during the first half of 2019. Clearly, the rapid change of the last eleven months is just a sign of what's to come.

We are neither Cassandra nor Miss Cleo. We cannot predict with any level of certainty exactly what form the big advances, setbacks, and milestones of the future will take. But, by considering the trends impacting healthcare outlined above and how players are likely to respond, we can infer how the industry will evolve over the next 10 years. In the meantime, we believe a series of inevitable movements, mindsets, and actions will unfold over the next decade.

INEVITABLE AND INSPIRING FUTURE TRUTHS TO ANTICIPATE BY 2030

Taken together, the following Future Truths (many of which are explored throughout our *Innovation Journal*) represent fundamental changes to the healthcare ecosystem, and when they come to pass, will shape how we as an industry engage consumers, focus investments, and forge partnerships.

WE WILL SEE THE END OF "ONE-SIZE-FITS-ALL" HEALTHCARE

[Over 70 percent](#) of the global population is experiencing a rise in inequality. In Latin America and the Caribbean, for example, people with disadvantaged backgrounds are 43 percent more likely to have a disability. In the US, African American infants [die](#) at double the rate compared to babies of other races and ethnicities. The bottom line is there can be tremendous difference in people's needs and outcomes based on social determinants of health (and who pays for their care), even for those that live in the same neighborhood.

Many healthcare organizations do little to distinguish their products and services offerings by payer segment today. On the contrary, many community health systems and regional health insurers pride themselves on their ability to serve individuals the same regardless of who pays their healthcare bills. Given this philosophy, healthcare organizations have managed margins primarily through cross-subsidy — private health plans paid 241 percent of Medicare rates on average in 2017 — and payer mix management.

Here in the US, for example, over the next ten years, rising Medicare, and Medicaid enrollment will mean that cross-subsidization will be insufficient for break-even economics. Employers, already fed up with healthcare cost increases that far outstrip inflation, will demand that carriers and network administrators hold the line. The largest source of market growth will be in government segments. To be financially viable, healthcare organizations will have to find ways to be profitable in every segment they serve.

The requirements for running a successful Medicaid, Medicare and commercial business vary, given the different consumer preferences, customer demands, reimbursement realities, and regulatory requirements of each. Thus, organizations will need to invest in increasingly specific capabilities by segment; the claims system that works well for ASO (administrative services only) employers will not perform efficiently enough for Medicare Advantage. Only the largest organizations will be able to afford a diversified book of business given the costs.

These dynamics will lead the US healthcare ecosystem to shift from "one-size-fits-all" toward purpose-built models that meet the specific demands of each line of business. This type of specialization is not new — most developed countries have distinct private and public healthcare ecosystems, with less expenditure and better outcomes. And we are already starting to see evidence of diverging business models, with organizations as diverse as Centene (in Medicaid), Oscar (in individual and small group), and Humana (in Medicare) demonstrating that focused operating models can deliver positive results for consumers, customers, and investors.

If done right, increasing specialization by line of business will reduce disparities in health and improve outcomes for all. To realize this potential, there must be adequate level of focus and investment for government-funded segments, be it through incentives, regulations, or both.

WE WILL GET CARE EVERYWHERE, ALL THE TIME

Over 66 percent of the world has a cell phone meaning that most people are also walking around with a medical device in their pocket. Today, smartphones can count steps, measure blood pressure, take blood oxygen levels, detect atrial fibrillation, and connect to pretty much any piece of medical equipment (from blood pressure cuffs to glucometers) a consumer may need. Individuals can call, text, or video-chat with their doctor, seek advice from an AI-powered triage solution, order medications for same-day delivery, or summon a doctor or urgent care provider to their home. Providers, payers, and consumer companies can deliver "just-in-time" notifications and reminders in turn, combining real-time consumer data with behavioral-science based algorithms to increase engagement and improve outcomes. Combined, these technologies enable individuals to receive care where and when they need it — at a fraction of the cost of existing, facility-based solutions.

>**66**%

population that carry a portable medical device (cell phone) in their pocket

We have had the technology needed to move much of the care individuals receive in medical facilities to virtual or home-based environments for years. Virtual health's slow pace of growth has not been a problem of technology, but rather adoption. Lack of consumer awareness, provider skepticism, and regulatory hurdles (particularly in Medicare) have all played a role in slowing the shift.

The rapid virtualization of healthcare services due to COVID-19 has cleared many of these obstacles. For those that are fans of virtual care, it is tempting to say that COVID-19 was a "Field of Dreams" moment, and that virtual solutions will rapidly prevail over traditional in-person care from this point forward. We do not expect that to be the case. Longstanding relationships between consumers and providers will be hard to disrupt, provider practicing patterns will take time to transform, and the pricing parity between virtual and in-person care negotiated during the pandemic will level the playing field — all of which will slow the virtualization of healthcare.

Ultimately though, virtual ecosystems will emerge that offer step-change evolution in convenience and affordability — and these solutions will predominate, just like they have in every other industry. Whether it's legacy payers, providers, software companies, or hardware companies that crack the code is anyone's guess — but regardless of who does, they will present a credible competitive threat to local provider organizations as they exist today.

HEALTHCARE SUPPLY WILL BE RIGHT-SIZED

Fee-for-service reimbursement models have incentivized healthcare delivery organizations to invest in services — and the personnel, facilities, and equipment they require — that drive revenue and operating margin, versus total cost-of-care management. Recent analysis done in conjunction with Oliver Wyman Actuarial shows that when age-sex adjusting for the projected 2030 population, we will have 1.3 times the number of inpatient beds that we need — if we stopped building additional inpatient beds today.

This also leads to inequitable distribution of healthcare supply and experiences across geographies (rural areas have 40 percent fewer primary care physicians per 10,000 individuals than urban areas) and different population groups (only 27 percent of Black, 27 percent of Latinx, and 23 percent of low socioeconomic individuals agree all patients are treated fairly).

As the market shifts toward value-based reimbursement, particularly in segments such as Medicare and Medicaid, those services that generate significant operating margin within provider organizations will become cost centers. Health systems will start aligning resource levels to what their attributed population needs, versus the total number of services their catchment area can support. With a proliferation of lower-

40%

fewer primary care physicians in rural areas per 10,000 people, compared to urban areas

cost virtual- and home-based options — many of which have national scale — it will be harder to justify maintaining today's expensive infrastructure. And that infrastructure is about to cost a whole lot more: the median average age of hospital plant facilities between 1995 and 2015 rose by 30 percent; rating agencies have downgraded the not-for-profit hospital sector; and while low interest rates make it easier to borrow, increasing pressure from pension liabilities are straining health system budgets. Provider organizations will have to develop more efficient ways to deliver healthcare services if they are to remain viable and thrive into the next decade.

Right-sizing supply is not just about reducing infrastructure. A shift in health system investment toward hospital at-home models, for example, has potential to increase access to acute care for individuals living in rural communities. Leveraging hub-and-spoke models could expand specialist access for underserved populations, ensuring many more people receive high-quality specialist care when they need it. These moves and others will afford an opportunity to build toward a more equitable distribution of resources over the coming decade.

ACCESS WILL BECOME COMMODITIZED

Over the past five years, organizations across the value chain — and those looking to get into the market — have rushed to control healthcare's front door and provide differentiated access to services. We see evidence in nearly every large move healthcare organizations have taken, including new products (such as CVS Health Hub and Walmart Health), acquisitions (such as OptumCare's expansion and Teladoc-Livongo), partnerships (such as Walgreens/VillageMD, Humana/Welsh Carson Anderson & Stowe) and a growing list of successful IPOs (such as One Medical, Accolade, Oak Street Health, AmWell, and GoodRx). These organizations are not just investing in new front doors to increase consumer affinity: Owning this initial touchpoint is seen as critical for achieving a whole host of strategic objectives, from reducing total cost-of-care to increasing share of wallet.

Today, owning the front door is very expensive, with companies spending billions to build, acquire, or integrate (in most cases unprofitable) facility-based primary, retail, and urgent care capacity. With virtual- and home-based models, providing convenient and affordable access is much easier and cheaper to do, and we are already seeing "virtual-first" products emerge. As virtual health solutions shift more toward AI versus expensive, skilled labor, organizations will be able to provide 24/7, immediate access to their consumers for nearly zero marginal cost.

Today, 20 percent of people change their provider because of access and convenience. In 10 years, because of the proliferation of low-cost, automated front-door access care models, consumers will take ubiquitous access to high-quality preventive and primary care as a given. To get patients through the proverbial door, organizations

must differentiate through other means — providing increasingly personalized service, offering delightful signature experiences, or granting unique access to services (specialist care, health, and wellness support) that consumers value.

DATA SHARING WILL FOCUS MORE ON CARING

Healthcare companies are collecting and capturing more and more data every day: Between 2016 and 2018, for example, healthcare organizations saw an 878 percent growth rate in the amount of data they manage, with the average organization having access to 9.6 PB of data. And the amount of data is expanding, with increasing collection of biometric- and device-generated data. For example, Blue Button 2.0 from the Centers for Medicare & Medicaid Services (CMS) has collected four years' worth of 53 million Medicare beneficiaries' demographic, prescription, treatment, device, and payment data.

Today's healthcare organizations have already seen the writing on the wall on access and are investing in proprietary data as a hedge, going to great lengths to design products — and influence regulations — that keep consumers in their ecosystems. This includes creating barriers to consumers collecting and sharing their information across competitors; the minute a consumer changes their insurance carrier or their provider, it is like starting from scratch.

At a minimum, consumers expect to be in control of their healthcare data, and regulators are listening, as evidenced by the Centers for Medicare & Medicaid Services by CMS' Interoperability and Patient Access final rule. But beyond just healthcare data, consumers across the globe are also willing to share their data: 63 percent of workers worldwide are willing to share personal health information to receive higher quality care, and 54 percent to receive more personalized care. Far from being reluctant to share data, consumers will expect their healthcare service providers to share information and, in turn, deliver experiences that earn their trust.

Financial services might show the path forward: Acquisitions by large players, such as when Plaid was bought by Visa or Finicity was bought by Mastercard, have significantly expanded data sharing in payments. Mint, as another example, allows for someone's different financial accounts to show up in one spot on their phone, updated in real-time.

Just like in financial services, it will not just be consumer demand that leads to greater healthcare data sharing: As more and more solutions proliferate, no one company will have access to all the data they need to manage population risk, track outcomes, or acquire consumers. This will create a collective need for secure, rapid, inexpensive data sharing, shifting the source of competitive advantage from owning the data to generating unique and personalized insights. The next 10 years will see a democratization of data through open APIs (application process interfaces) or other technologies, as all organizations build toward better integration and access across third-party solutions.

20%

people that change providers because of access and convenience

HEALTHCARE WILL BE MADE FOR YOU, NOT ME

Healthcare is already personalized, with organizations providing individual-level service based on practitioner expertise and judgment. Providers leverage decades of training to recommend treatments to patients, case managers connect individuals to resources based on their specific health and social needs … even insurance brokers and benefits consultants design health insurance plans based on the specific employer groups they serve. And while today's personalized healthcare provides individual-level service, it is also labor-intensive, prone to variability and error, and expensive to deliver.

The next decade will bring personalized healthcare at scale. This is driven by three factors: better data, more available data, and better analytics. Continued advances in genetics, biophysics, behavioral science, and many more disciplines will expand what is knowable about any individual. Readily available, just-in-time data sharing will exponentially expand the number of data connections possible, and the richness of insights that can be developed. Smarter artificial intelligence engines will drive toward increasingly better recommendations — and continued advances in computing power will allow these algorithms to take in more and more information.

This is not a vision of science fiction, with magical hand-held devices instantly diagnosing genetic mutations and characterizing new diseases. There are specific examples of personalization in small pockets, where inventions such as CRISPR have had a far-reaching impact on individuals with genetic mutations (for example, beta thalassemia and sickle cell disease). These critical advances in science could have a far-reaching impact on how the industry will be shaped moving forward — including how the dollars flow across the system. The ability to deliver personalized, high-quality care with less and less human capital will reshape fundamental roles across the healthcare industries, from physicians to research scientists to actuaries.

THE DISTINCTION BETWEEN "MEDICAL" AND "PHARMACY" WILL DISAPPEAR

Increasingly sophisticated and personalized therapeutics have come at a cost. The rising cost of pharmacy — and specialty pharmacy in particular — has been a constant refrain in recent years, but now we are reaching a tipping point. Pharmacy represents 13 percent of today's total healthcare spend and is growing at a worrisome rate. At Anthem, for example, employees use pharmacy benefits three times more compared to their medical benefits. Consider also that price hikes drove employer-sponsored health costs to record highs in 2018.

Expensive as they may be, biopharmaceuticals deliver substantial value to patients and communities and are a critical tool to lowering overall disease burden. Increasingly, biopharmaceutical interventions are being developed that replace medical intervention completely. Examples range from interventions that each of us will eventually need

13%

of today's total healthcare spend is on pharmacy

(such as Cologuard in place of preventive colonoscopies), to cures for rare diseases that save patient lives and obviate the need for years of hospital care (such as Zolgensma for spinal muscular atrophy).

Patients and providers are already looking at medical and biopharmaceutical interventions side-by-side in making treatment decisions … but on the back-end, the industry is not structured to support an integrated approach. Outside of the doctor's office, pharmacy and medical care are treated entirely separately: Delivery is siloed and benefits are siloed. These structural barriers will become untenable as pharmaceutical interventions become more complex and costs rise.

Over the past decade, large players across the ecosystem have started bringing the different components together, laying the groundwork for much deeper medical and pharmacy integration. With the promise of better patient outcomes, more holistic experiences, and lower individual and population health costs, it is only a matter of time before one or more of these organizations takes the next step, building products and services that merge medical and pharmacy payment, access, and delivery.

CLIMATE CHANGE WILL BE THE MOST SIGNIFICANT FORCE IMPACTING GLOBAL HEALTH

Even if the healthcare industry stands still for the next 10 years, we cannot escape the impacts that climate change will have on health across the globe. Extreme temperatures, droughts, rising sea levels, wildfires, hurricanes, floods, and the like will destroy infrastructure, threaten water supplies, create hazardous living conditions, cause food insecurity, and spark migration and conflict across the world.

The healthcare industry is a major contributor to climate change: the sector is the fifth-largest emitter of greenhouse gases on earth. Healthcare organizations will also be subject to climate change's impacts, as it will worsen every major category of disease burden: infectious disease, chronic disease, mental health, injuries, and deaths. This combination of cause and effect should push the industry to demand change and adopt more sustainable business practices. Across every major healthcare stakeholder, there are real opportunities to reduce emissions, from greening supply chains, eliminating unnecessary and wasteful care, and investing in preventive care that builds community resilience.

We have not done enough, as an industry or as a society, to stop the impact of climate change or even react to climate crises that emerge today. It remains to be seen whether healthcare organizations will mobilize and transform their business models to better withstand the impact. The next 10 years will see more severe and more frequent climate crises — the question is, which communities will be ready, and which will fail.

CHANGE MEANS CHOICES

Each of these truths will push us in different ways and force us to accept the most sanguine truth of them all — that change is inevitable, and we have the power to shape the form that this change will take. Over the coming decade, we will face a series of choices — big ones, small ones, and ones that will feel insignificant but will impact us (and the industry) in major ways. As organizations make these choices, each will face existential questions about the nature of their business and their role in delivering healthcare to their customers.

Where will our businesses achieve scale, and is that scale defensible? With virtual and home-based care models and process automation, scale will become more than back-office efficiency or negotiating leverage. For all but the largest players, scale will have to come from other sources — local market knowledge, unique data insights, and one-of-a-kind experiences. Organizations must ensure sources of scale advantage ultimately guide our decisions on building, buying, or partnering for new capabilities — and which existing capabilities to outsource or wind down. And we cannot be fooled by just moving everything online — without automating significant parts of both clinical and administrative workflows, we will still be tied down by labor-based economics.

Where will we generate and leverage unique consumer insights? For years, organizations believed data equals power. As a result, most organizations fight to maintain control of their data and historically, it has been viewed as a locus of strategic control. However, as the market moves to open API interfaces, and data becomes more and more democratized, the value will shift from data to insights. We must make careful decisions on future data investments, balancing focus on acquiring necessary data with generating unique insights.

Who is the primary customer? Do we have a choice? The reality is that a one-size-fits-all model just doesn't work in healthcare. Most businesses will need to choose. Current capabilities and projected demographics will force the hands of many organizations (particularly local health systems and regional health plans) that historically have preferred to serve commercially covered populations.

When will we begin the shift away from facility-based services? As consumers elect more virtual- and home-based care, the need for (expensive) physical facilities will diminish — but this shift will not happen overnight. Hospital systems and physician organizations alike must weigh options and investments in physical versus virtual and home-based care delivery, walking a fine line between going "too virtual" too soon, versus carrying expensive assets that never deliver a return on investment. We will still need intensive care units and surgical facilities a decade out. It's just about making things like these available to people on a needed basis.

A one-size-fits-all model just doesn't work in healthcare

When will the differentiated services we provide be automated — or are they already? As the healthcare technology sector continues its rapid growth, and machine learning and AI present ever-more promising possibilities, investing in tools and enablement technologies that support differentiated services that are expensive today (including physician-delivered care, concierge service, and network contracting) will forge the future path for several organizations.

It's our responsibility to step forward and make those choices. Unfortunately, not making a choice is also a decision — at a minimum, being deliberate is a choice everyone should make.

GO OUT THERE AND DO IT

There is so much we do not know. But we do have faith that we will make the critical decisions that will enable our industry (and the individuals and communities we serve) to thrive. We must sketch out how our businesses may be operating five or ten years out. We must dive into healthcare as being continuous versus a series of unrelated or fuzzy touchpoints. We must approach scale, growth, and communication as ideas and actions that transcend physical interactions and "business as usual." To do this, and more, we must lead differently, lead better, and lead as empowered, informed, and inspired decision-makers. The unknown awaits. We are ready.

As much as the last 11 months have stretched all of us to our limits, we have also learned that when pushed, we can do what it takes to keep our communities and the globe healthy and strong.

AUTHORS

Parie Garg, PhD, Partner, Health and Life Sciences, Oliver Wyman

Rachel Zeldin, PhD, Principal, Health and Life Sciences, Oliver Wyman

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When you go out and see the empty streets, the empty stadiums, the empty train platforms, don't say to yourself, 'My God, it looks like the end of the world.'

What you're seeing is love in action. What you're seeing, in that negative space, is how much we do care for each other, for our grandparents, for our immuno-compromised brothers and sisters, for people we will never meet.

People will lose jobs over this. Some will lose their businesses. And some will lose their lives.
All the more reason to take a moment, when you're out on your walk, or on your way to the store, or just watching the news, to look into the emptiness and marvel at all of that love.

Let it fill you and sustain you. It isn't the end of the world. It is the most remarkable act of global solidarity we may ever witness. It is the reason the world will go on.

Bill Gates
Co-founder of Microsoft Corporation

08/21
A. Ramsey, MD

PATIENT

38%   75%
67%   23%

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FUTURE TRUTH | ACCESS

THE NEW CARE DELIVERY WORLD

Competition between healthcare providers traditionally has been static and predictable. Organizations have tended to rely on beating rivals on the basis of a strong presence on the ground and consumers' interpretations of clinical brand quality. That is, until now. The new basis of competition between care delivery organizations is shaping up to look very different. This is because of rapidly evolving care delivery needs and the need to "catch up" to what consumers want versus what they're being offered. Players will (mostly) win on ease of use, price, and supporting people to live healthier lives, rather than winning because of an overwhelming local presence and consumers' fuzzy notions of quality.

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Technological advancements have revolutionized medicine in recent decades. Procedures that could only have been imagined in the past — for example, the use of DNA to guide care decisions or minimally invasive procedures — has become commonplace, with patients enjoying their benefits. And providers' operations have also benefited from improved record-keeping, administration, and billing.

At the same time, however, the consumer experience has seen little improvement. Access to care, overall, remains constrained, and scheduling care is predominantly analog — phone calls with elaborate voice menus are common when trying to access care, for example. Moreover, the nature of care continues to be reactive, patient-driven, and conducted in response to illness.

The consumer-centric healthcare revolution — long predicted — has yet to materialize. However, a tipping point is now within sight. Enhancing the consumer care delivery experience and supporting people to be healthier will become the dominant key to success. Below, we outline some traditional means of differentiation and how new factors centered on enabling a better consumer experience will become the dominant themes in the future.

LOCAL DENSITY AND PERCEIVED QUALITY

Traditionally, competition between healthcare players has focused on two key elements:

Local availability: Creating a robust network of brick-and-mortar care locations predicated on primary and specialty-care offices and revolving around a local acute-care hub such as a community hospital.

Clinical brand and quality: Communicating and convincing consumers that clinicians who are employed by a health system are highly trained, highly capable, and are delivering error-free, effective care. This includes showcasing clinical superiority capabilities (such as a new surgery technique or cutting-edge instruments), with the belief that these positively impact all other services. It also includes competing on the latest advanced technologies or equipment. Consider, however, that a [reported](#) 59 percent of consumers tend to focus on doctor-patient relationships and personality versus 29 percent who tend to focus on care delivery or outcomes.

Of note, a small number of institutions have transcended the limitations of local geography and have been able attract patients from across the nation and the world. The Mayo Clinic is one such example. Similarly, some innovative plan sponsors (such as Boeing, Pepsi, and Walmart) have been identifying national-level centers of excellence and diverting their employees/members there. Still, the bulk of care delivery competition is happening within the context of a confined locale.

59%

consumers that focus on doctor-patient relationships over care delivery

DRIVERS OF CHANGE

In recent years, however, macro and industry dynamics have begun threatening to upend the traditional basis of competition:

- People's experiences with other consumer-facing industries have set the bar high for what they expect from healthcare providers (for example, timely access to services). Similarly, a generation of more-educated consumers, with greater and faster access to information and resources than ever before, has come of age.

- Increased costs have caused plan sponsors and consumers to scrutinize and favor comparable lower-cost care options (such as stand-alone imaging sites or ambulatory surgery centers).

- Employers have been addressing cost concerns by shifting more cost responsibility over to employees.

- This staggering increase in consumer financial responsibility has shifted patient behavior, forcing them to act more like informed customers.

- Finally, clinical advancements have allowed care to be delivered in less specialized settings, making it more accessible. (Consider, for example, the shift from tertiary to community, from inpatient care to hospital outpatient departments to ambulatory surgical centers, or from offices to homes).

THIS TIME IS DIFFERENT

In recent years, we have both seen [and made](#) predictions regarding the basis of competition for care delivery — forecasts that didn't materialize. So, what makes this time different? Three specific factors are at work currently.
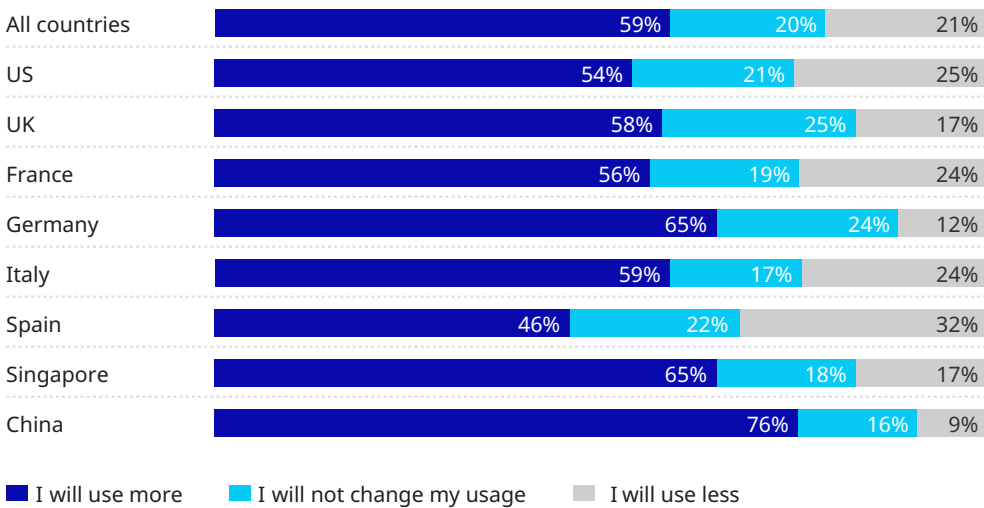
First, payers have been vertically integrating. They are looking to control the key elements of care delivery that influence the total cost of care (for example, primary care). CVS-Aetna's Health Hubs, Optum's ownership of physicians, and various Blues launching care delivery assets are just some examples. All are adding access points that emphasize convenience, price, and an integrated health experience.

Second, the digital care model has been quickly adopted as a result of COVID-19. (For example, the rate of private-insured medical claim lines associated with digital care have jumped nearly 40-times fold in March 2020, compared to 2019.) This shift has introduced the public to the possibilities of a care model that's location-agnostic and virtual-first, with required physical interventions rounding out clinical care rather than being the default. Indeed, nearly 60 percent of people who used telehealth for the first time during the pandemic (or increased their usage) said that they will continue to use telehealth once stay-at-home orders are lifted. (See Chart below.) Moreover, even before the pandemic altered the landscape, we had observed that once consumers try digital care, they generally find it appealing.

Exhibit 1: What consumers' increasing telehealth interest looks like around the world
Q: How frequently will you use telehealth once stay-at-home orders end?

Percentage of respondents who increased use or used for the first time during COVID-19

Country	I will use more	I will not change my usage	I will use less
All countries	59%	20%	21%
US	54%	21%	25%
UK	58%	25%	17%
France	56%	19%	24%
Germany	65%	24%	12%
Italy	59%	17%	24%
Spain	46%	22%	32%
Singapore	65%	18%	17%
China	76%	16%	9%

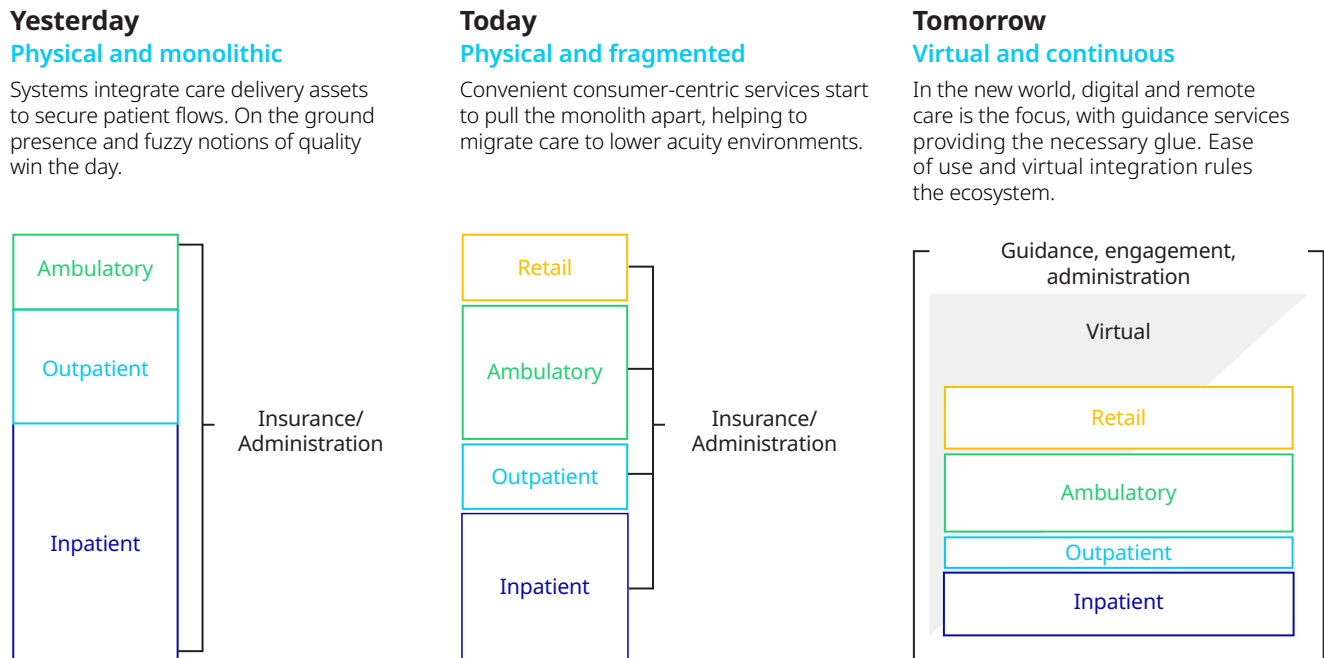■ I will use more   ■ I will not change my usage   ■ I will use less

Source: Oliver Wyman Forum

Third, the unstoppable pace of technology development (including cloud computing, the Internet of Things, processing power, bandwidth, and wearables) means an "always on" approach to healthcare is a real possibility. This approach is centered on proactive monitoring and real-time engagement, thus diminishing the importance of the provider visit. Technologies such as continuous glucose monitoring (CGM) and Apple Watch's cardiogram were early examples of this proactive, real-time approach. More recently, discrete information flows are being aggregated to create a 24/7 picture of health. (Consider, for example, Propeller's asthma inhaler that uses sensors to track your medication use, or Pillsy, which sends patients smart medication reminders when they forget a dose.) In the future, business models embodied in the recent Teladoc-Livongo deal, for example, are expected to leverage these possibilities.

FOUR FEATURES OF A NEW WORLD

A new basis for competition. Over the next decade, we believe that as a result of some of these trends, players will compete on a different set of attributes than do they today. Moreover, the recent adoption of virtual and digital care is only just beginning. So far, providers have been taking their legacy care models and making them virtual. There remains significant headroom to reinvent care delivery — primary, secondary, and even tertiary care — that is untethered to a physical modality.

Exhibit 2: Evolution of care delivery ecosystem in a commoditized/democratized healthcare world

Yesterday
Physical and monolithic

Systems integrate care delivery assets to secure patient flows. On the ground presence and fuzzy notions of quality win the day.

Today
Physical and fragmented

Convenient consumer-centric services start to pull the monolith apart, helping to migrate care to lower acuity environments.

Tomorrow
Virtual and continuous

In the new world, digital and remote care is the focus, with guidance services providing the necessary glue. Ease of use and virtual integration rules the ecosystem.

Source: Oliver Wyman analysis

The basis of competition will thus shift from having a strong physical presence and clinical brand to ease of use, experience, and cost. Technology will open up local markets — traditionally insulated from external forces — to be part of a national, even global, marketplace where players will compete for consumers' and plan sponsors' wallet share. It's important to note the shift of strategic control away from local presence and clinical brand perception has already begun in parts of the care delivery continuum. For example, urgent care is no longer controlled by traditional primary care, as a plethora of physical and virtual options have sprouted up. And access to behavioral health is being democratized with app-based services such as AbleTo. We expect other segments of care to follow suit, where interactions are primarily about information exchanges rather than a laying on of hands — for example, a greater future focus on disaggregating specialist consultations from surgery.

A new taxonomy for care delivery. We predict this trend of reclassifying care will continue and ultimately envelop many clinical use cases — except for truly cutting-edge clinical innovations. This will cause a redefinition of the traditional primary-secondary-tertiary hierarchy of care, which lends itself to accept clinical specialization as the yardstick for care delivery. Instead, consumers will come to think of care delivery in terms of a hierarchy of modalities. This hierarchy will start with self-service as a default, continue with artificial intelligence/bot-led interaction, and only later be followed by a clinician interaction. This clinical interaction will take place initially as a virtual visit, with a physical and appointment-based visit happening almost as a last resort.

New care models. We also believe care models will evolve from reactive and open-ended to proactive and closed loop. Providers will make use of massive, ongoing information flow that is fed, processed, and analyzed automatically to detect and alert required human interventions — instead of waiting for the person to present with symptoms or leaving it to chance that the patient will follow through on the care instructions they have been given. As the models progress, data collection and inputs into the care continuum will increase — beyond just consumer self-reported data, episodic consults, or scans. As technology advances, wearables and remote monitoring proliferate, data will drive improved clinical outcomes and redefine encounter-based care models. And because care was triggered on-time (or even, preventively) rather than through a person realizing he or she is suffering or is experiencing an acute event, the intervention will become far more personalized and contextualized to the individual's needs.

It's important to note that not all care that can be digitized will automatically become a virtual experience. Some consumers will still favor physical interactions even when comparable care can be delivered virtually. However, access to care will become consumer-driven: on-demand and at the modality of their choice, such as office, retail, home or digital.

> Access to care will become consumer-driven: on-demand and at the modality of their choice, such as office, retail, home or digital

Exhibit 3: The present and future digital-first consumer experience

2020

The patient care experience is separated by visits, segmented by providers' individual qualifications

Primary care → **Specialists** → **Acute care** → **Post acute care**

2030

The patient experience is digital-first, continuous, two-way, and on-demand

"Always on" care
- All day and all night patient observation, data collection, medical analysis and proactive alerts
- Devices like Apple Watches reach a broad population
- Reliable "self service" addresses most health and medical issues

Virtual/Digital care
- Chats are asynchronous-led, with access to phone or video calls
- 24/7, minutes to appointment (versus days)
- Care is on-demand with proactive outreach
- Care is informed and contextualized across the full spectrum of specialties
- Diagnoses, care planning, and management are location-agnostic

Physical care
- Provides confirmation of "always on" and digital evaluations
- Applies vastly broader expertise than is available in one or even a team of providers
- Extended hours, seven days a week
- Health records are consumer-owned and portable

Interventional/Procedural
- Ambulatory sites are the default
- Doctors have a physical, hands-on focus
- Non-MD services like infusion and imaging are commoditized

Recovery
- Home is the care default
- Virtual daily tracking and support
- Physical interventions are targeted, conducted as needed

Source: Oliver Wyman analysis

The long-term implication of all this can potentially be a shift from a reactive "insurance-based approach" to care and the coverage of sickness-related financial costs, to a proactive, timely "assurance" of health.

New workforce competencies. When technology allows clinicians to intervene only with individuals requiring their attention, and when consumers can access self-service tools such as care bots, panel size can increase. However, clinicians will need to relearn key portions of their training — for example, Review of Symptoms (ROS) — now processed and presented to them by an electronic system first. The nature of clinicians' employment, recently reimagined as a work-from-home job during COVID-19 and

enabled by the thirst for talent by telehealth companies — may be reinvented, with a meaningful part of the workforce opting for an independent contractor status that allows them greater scheduling flexibility.

The implication of this new world is that even players with strong clinical advantages should consider their ability to attract consumers in a future where the consumer is routinely cared for in an integrated, easy to use, and cost-effective way. In this future, those players that own consumer loyalty will influence downstream care decisions via referrals and recommendations, thus making tertiary-care providers more dependent on them.

We foresee the deciding factors of providers' business models undergoing a sea change. Instead of the traditional local presence and perceived clinical quality, a new type of provider organization will emerge — one that will succeed based on its ability to serve consumer needs and that will leverage digital capabilities as an integral part of its care model. The onus is on incumbents to adapt to this new environment.

AUTHORS

Tom Robinson, Partner, Health and Life Sciences, Oliver Wyman
Helen Leis, Partner, Health and Life Sciences, Oliver Wyman
Ran Strul, Principal, Health and Life Sciences, Oliver Wyman
**Julia Goldner,** Principal, Health and Life Sciences, Oliver Wyman

HOW HEALTHCARE SUPPLY CAN BETTER FIT DEMAND

The United States healthcare system has yet to pivot over to value-based, consumer-oriented care. As a result, our fragmented patient journey is emptying consumers' wallets, hindering delivery execution of high-quality, low-cost care, and saddling the nation with an expensive, unnecessary acute care infrastructure. Despite this article's dismally toned introduction, we are optimistic about the future and see a substantial correction coming over the next decade.

—

WE HAVE AND USE WAY TOO MANY BEDS

COVID-19 exposed the paradox in our system: The US had more than enough inpatient beds — it just didn't have the right ones. Recent Oliver Wyman analysis shows that if we adapt utilization patterns and stop building beds, we will have 1.6 times the number of inpatient beds than we will need in 2030. Said differently: The current supply of inpatient beds is far higher than what we need now, or even what we will need a decade from now ... despite the population continuing to grow, age, and ail.

Exhibit 1: Projected over-and-under-supply of inpatient beds in 2030
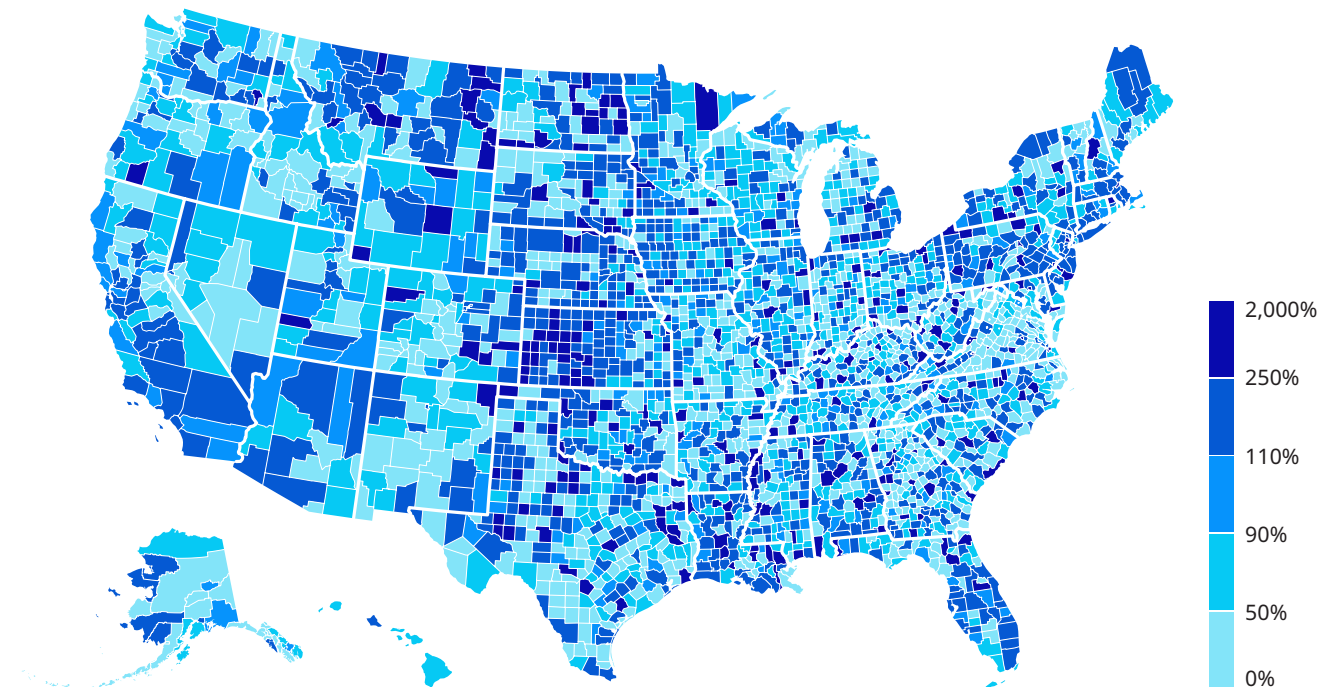
Source: Oliver Wyman analysis, MarketScan, CMS 5% National Sample, US Census, American Community Survey

The mismatch reflects the delta between, "what is it that the population can support?" — a question that drives capital planning in a fee-for-service market — and, "what is it that the population needs?"

To answer the latter question, we leveraged the utilization profile of the top 15 metropolitan statistical areas (MSAs) by value-based-care penetration — spanning large portions of California, and ones inclusive of select markets across Oregon, Colorado, Michigan, Nevada, and Massachusetts; then we age-sex adjusted the utilization for every county's projected 2030 population. The assumption behind the MSA selection is that markets with sufficiently high penetration of value-based care will drive appropriate utilization for all patients — even those in fee-for-service arrangements. These markets are not theoretical. The mismatch reflects an achievable reality.

The delta between our projected need and our current supply is driven by demand-side factors — such as performing surgeries in outpatient settings — as well as supply factors — we assumed utilization of 80 percent for urban counties and 70 percent for rural counties (rural counties are defined as those with less than 50,000 people).

The US hospital sector operates at around 64 percent bed utilization — well below our 80 percent assumption and even further off from the 83 percent regulators use as the benchmark for an "efficient" annual average to handle demand volatility. If the 83 percent figure was taken at face value, it suggests 23 percent of beds nationwide should be rationalized. At more operationally manageable levels of 75 percent capacity, the opportunity would be 15 percent (before any corrections to demand). For our analysis, using a utilization rate of 64 percent reduces the projected 2030 over-supply from 1.6 times supply to 1.3 times supply.

64%

bed utilization in the US hospital sector

On the demand side, industry length of stay (LOS) has moved little over the past decade, but this is likely the result of incremental progress on LOS being offset by increasing underlying acuity, as lower acuity services have moved out of hospitals. Bed days will continue to decline as the industry matures in case management and operational efficiency capabilities. Our analysis assumes care guidelines don't change between now and 2030. Given this, expect the mismatch to be even greater.

The paradox in our system is we have the wrong bed types. The US has an abundance of medical and surgical beds and too few intensive care unit (ICU) beds — likely because ICU beds are often unprofitable in a fee-for-service schema. Our overall oversupply of beds belies the fact that we have less than half of the ICU/critical care unit (CCU) beds that we will need in 2030.

WE'RE POINTED TOWARDS POSITIVE CHANGE

With healthcare's relatively recent value prioritization, is the situation noticeably improving? US bed supply has indeed been on a slow decline. Although demographic factors generally created upward pressure on demand, clinical and business innovations shifting services outside the hospital have been the dominating influence — for example, consider that the system's hospital bed supply has been falling for the past couple of decades. The total number of hospitals, hospital beds, and admissions alike fell by roughly three percent from 2008 and 2018. The US population, for comparison, grew by 6.3 percent from mid-2010 to mid-2019. The US population has experienced a recent increasing burden of chronic disease, with 60 percent of adults having a chronic disease and 40 percent having at least two.

THE NEXT DECADE WILL LOOK DIFFERENT

Demographic trends will keep putting upward pressure on acute demand over the next decade. Beginning in 2030, it's projected that immigration will overtake the excess of births over deaths as the main cause for US population growth. Yet, those residents over 65 will grow by 30 percent through 2030 — far faster than the 10 percent increase over the past decade — as the youngest baby boomers age into Medicare. Only a few years later, older adults will outnumber children for the first time in US history. Also, the US adult obesity rate reportedly tops 42 percent. (It's worthy of note that stats like these are critical in shaping healthcare's future supply and demand capabilities as we head into 2030.)

Will innovations in care delivery, business models, and consumer engagement continue driving a net decline in demand and supply in the next decade? We believe so — due in no small part to COVID-19.

THREE REASONS HOSPITALS WILL BE PROGRESSIVELY DISPLACED IN SERVING LOW-ACUITY VOLUME

Virtual- and digital-led new front doors and population health innovators are proliferating. At the start of the pandemic, health systems saw all non-emergent professional activity moved to virtual almost overnight and long-held beliefs about who would or would not adopt, shattered.

Medicare went from 11,000 virtual users per week to 1.3 million per week — in a month. This was largely due to changes in Medicare reimbursement rules. From mid-March through early-July of 2020, over 10 million beneficiaries received a telehealth service. A survey by Kyruss shows that more than 75 percent of Baby Boomers expressed very high or complete satisfaction with telehealth. According to Oliver Wyman analysis, at least one in two people will use telehealth more after stay-at-home orders are lifted compared to before the pandemic.

While different people have different use cases for virtual, no age demographic is poorly suited; no age demographic will never need in-person care.

This bodes very well for innovators, including One Medical, Collective Health, and Livongo, who have shown virtual care plays a vital role in reaching consumers at the right place and right time, pre-empting acute episodes and avoidable emergency department (ED) visits to bring down total ED and acute volume.

Virtual care and digital innovation may have just as big of an impact on ambulatory care. At the time of this writing, many physicians nationwide are practicing part-time in-office, part-time virtually.

Payers are jumping on the bandwagon, as innovative, digital-first products such as Humana on Hand and Kaiser Virtual Plus are better positioning themselves to leverage digital front ends to mitigate avoidable admissions and redirect care to more convenient, higher-value, lower-cost service sites and care providers.

More homes as care settings. The home as a proper site of care, including acute care, will substantially reduce future hospital demand. Hospital-in-the-home programs, once pioneered by Johns Hopkins, are on the rise. Consider how, for example, specialized player Contessa is cracking the reimbursement issue through contracts with national payers. More established players are prioritizing this too, including major systems Mayo Health, Mount Sinai, and the scaled innovator CareMore. Most hospital-at-home models discharge patients to the home from the ED or discharge early from an acute stay. Now, some new companies are offering acute care on-demand, pre-empting the need for hospital visits. By diverting low-acuity admits to hospital-at-home and earlier discharge on stable acute patients, a leading population health executive that we spoke with expects the shift could reduce total bed days by up to 30 percent.

Urgent care will be disrupted, too. Imagine if urgent care came to you when you needed it, versus you transporting there physically. Consider one of many examples, Doctor On Demand, which has banked over $160 million since its conception in 2012. Launching initially as a virtual urgent care clinic, the platform offers 24/7 patient on-demand care. Physicians employed by the company see patients on video to talk about patients' health issues, diagnose urgent issues, and prescribe medicines. Another player, Heal, offers a longitudinal relationship with a physician who meets patients virtually or on-call to the home as needed.

Many physicians nationwide are now practicing part-time physically, part-time virtually

Sites of service will keep shifting. One of the more influential forces of the last decade was the shift of inpatient procedures to hospital-based outpatient (HOPD) and ambulatory. According to a prediction from the Ambulatory Surgery Center Association (ASCA), hip and knee joint replacement surgery will increase by 84 percent within the next decade. Despite a surge in demand for these procedures, inpatient volume will drop, while outpatient volume will spike. Over 57 percent of all non-fracture knee and hip replacements done by 2028 will happen in an outpatient setting, ASCA predicts.

This kind of industry opportunity will expand in the coming decade as the Centers for Medicare & Medicaid Services (CMS) continues moving more services off the inpatient-only list each year and as organizations continue to innovate around how to safely move more inpatient volumes to outpatient. Consider one of many examples — Muve Health, a value-based outpatient ambulatory joint replacement provider with a robust approach for better outcomes and experience, including near-site observation outside the hospital to facilitate patients shifts.

>57%

of non-fracture knee and hip replacements will happen in an outpatient setting by 2028

NOT ALL HOSPITALS WILL PROSPER. THOSE THAT DO WILL LOOK DIFFERENT

COVID-19 will accelerate bankruptcy and closures. Before COVID-19, American Hospital Association (AHA) data showed more than a quarter of hospitals operating at negative margins. The pandemic-induced loss of elective and preventive volumes will push some over the edge. The COVID-19-led unemployment spikes and resulting payer mix shifts critically impair more.

If, for example, CMS enforces Paycheck Protection Program (PPP) loan terms as currently structured, some independent practices may fall bankrupt, along with those hospitals that perhaps weren't financially strong before COVID-19 hit, let alone during. As sites close, immediate communities will face new access issues while the overall market cost structure declines.

This will take a few years to play out, with some sites closing and others successfully pursuing mergers and acquisitions (M&A).

Sub-specialization will reshape acute care and unlock capacity reduction. More hospitals will shift over time from the one-size-fits-all, take-all-comers approach to specialized sites of care within networks. Mounting financial pressure will increasingly force leaders to strategically prioritize services that support differentiation and unique value propositions. Investing in those areas will require a scaling back in services that are well supplied in the market but don't allow for differentiation.

Organizations moving in this direction — such as Chicago-based NorthShore's reconfiguration to concentrate orthopedic services into one site, for example — may gain high efficiencies through reduced duplication of infrastructure, cost, and quality efficiencies from scale, improved throughput, and reduced excess capacity from greater predictability of demand. Physician satisfaction and patient satisfaction also improve through more efficient, effective operations.

As systems pursue this strategy, higher predictability in demand will create a fair incentive for operators to right-size beds at these sites from a 65 percent average to levels above 80 percent.

The march to value will take a new turn, adding long-term pressure on performance and specialization. COVID-19 has shown providers the value in diversification that accountable care organizations (ACOs) offer. Financial strains and payer mix shift will lead government and private payers alike to drive affordability and medical cost management agendas for their employers. The movement to value — while elusive — will remain a front-and-center industry imperative. But the movement will not look the same in years ahead.

Transparency and value are merging to substantially change competitive dynamics. CMS is leading the charge on both fronts with its price transparency regulations and value-based reimbursement agenda. Rather than "value" being something separate or alongside the fee-for-service chassis, the fee-for-service system itself will increasingly be value-driven. The best example of this perhaps is CMS' new MIPS Value Pathways (MVP), which will progressively foster higher-quality transparency at the specialty level and vary payments based on specialty-specific quality performance (including downstream cost/utilization).

Recent Medicare Payment Advisory Commission (MedPAC) recommendations, for example, [suggest](#) this same concept will increasingly be applied to hospital arrangements. Private payers are already moving in this direction, with at least one major Blue plan tying one-third of a major academic medical center's (AMC's) fee-for-service reimbursement to value metrics.

As value transparency comes into the main stage, expect high disruption to patient care patterns and current funding streams. Enhanced pressure for service line-level performance will lead more hospitals to hone their scope of services. Those who fail to demonstrate a defensible value position will be forced to exit the market.

Expect high disruption to patient care patterns and current funding streams

CALLING FOR A MORE SUSTAINABLE ECONOMIC MODEL

Today's economic model depends on unsustainable levels of cross-subsidization. Higher commercial rates cover the costs of Medicare and Medicaid patients. Higher payments on surgical volumes cover costs for medical patients. Systems thrive or dive on their payer mix and medical-surgical mix. Even within a specific surgery type, lower acuity patients subsidize higher acuity patients.

The trends described above disproportionately threaten to reduce hospitals' highest-profit patients and volumes. While reductions of excess infrastructure and streamlining of operations are necessary to offset these pressures, cross-subsidization will also substantially worsen unless there's an intentional effort to rebalance prices across patients and services, through public policy, a coordinated industry effort, or both.

A BRIGHTER FUTURE

The next decade holds great potential for healthcare providers. There will always be a role for acute care in our communities, and the trends driving down acute demand are all to patients' net benefits. Those who embrace coming innovations and new rules of competition will be true leaders in the health and sustainability of their organizations and their communities.

AUTHORS

Tammy Tomczyk, Partner, Actuarial, Oliver Wyman
Minoo Javanmardian, PhD, Partner, Health and Life Sciences, Oliver Wyman
Bryce Bach, Principal, Health and Life Sciences, Oliver Wyman
Santiago Doria, Engagement Manager, Health and Life Sciences

REHAB WORKOUT

STRETCHING **10 min.**

SET 1 | SET 2 | SET 3

7% **WORKOUT DEMONSTRATION**
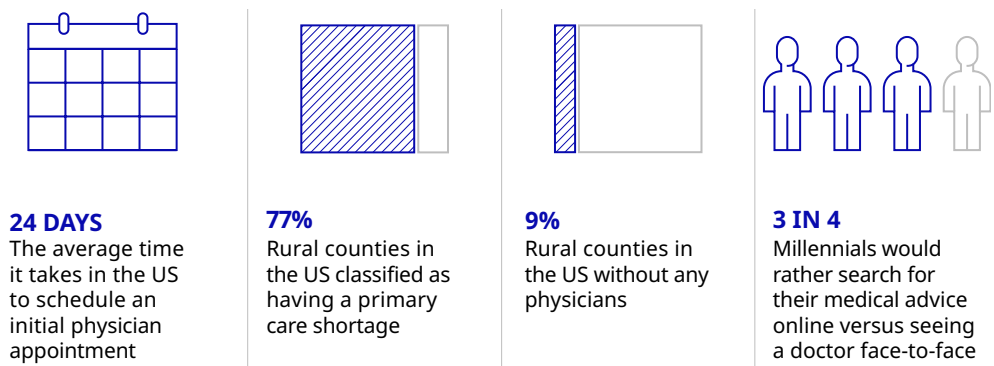
90'

YOUR PHYSICAL THERAPIST

Marina Williams
89786557

FUTURE TRUTH | HOME HEALTH

PHYSICAL THERAPY, DIGITIZED

The idea of healthcare services shifting from traditional, in-person delivery at clinics and hospitals to digital delivery at home is not new. That value proposition has been obvious for years: For the more than 7,000,000 people who are housebound or have mobility limitations, home care means accessible care; and for the two-thirds of emergency room visits that are avoidable and that cost the healthcare system $32 billion each year, home care represents a meaningful opportunity to deliver higher value, lower-cost care. Surveys repeatedly show consumers prefer home and digital care services. This is because these services feel much more personal, and the contextually rich environment they're delivered in can improve outcomes.

For decades, home care has focused on delivering high-acuity, labor-intensive services such as caregiving for the elderly, conducting health assessments, doing infusions, or providing palliative care. More recently, we've seen this focus expand — in response to consumer demand, accessibility issues, and economic pressures. Home and digital hubs are being considered for nearly the entire spectrum of healthcare services — from low-acuity assessments and primary-care physician visits, to highly intensive programs such as Hospital at Home. Favorable trends in supply economics — such as technology-enabled care, changing reimbursement regulations, market diversification, and the consolidation of home health agencies — have been positive tailwinds. Most of us anticipated the shift to home and digital care to be gradual … and then the COVID-19 pandemic struck. Telemedicine rates have skyrocketed over 100 percent month-over-month at many provider systems. The home is the de facto preference for most consumers seeking healthcare today. Will these trends sustain? And, who will "own the home"?

Exhibit 1: Setting the scene: Four telehealth stats to know

24 DAYS
The average time it takes in the US to schedule an initial physician appointment

77%
Rural counties in the US classified as having a primary care shortage

9%
Rural counties in the US without any physicians

3 IN 4
Millennials would rather search for their medical advice online versus seeing a doctor face-to-face

Sources: 1. Merritt Hawkins: 2017 Survey of Physician Appointment Wait Times and Medicare and Medicaid Acceptance Rates; 2. Bankrate, As coronavirus spreads, nearly 1 in 3 Americans admit to not seeking medical care due to cost. March, 2020; 3. National Rural Health Association; Harmony Healthcare IT, Survey Reveals Millennials' Relationship with Health Care, August 2019

Q&A WITH OMADA'S SEAN DUFFY AND PHYSERA'S DAN RUBENSTEIN

To discuss the seismic shifts in care delivery models, Oliver Wyman's Adi Lingampally, sat down with Sean Duffy, CEO and co-founder of Omada Health, and Dan Rubenstein, CEO and co-founder of Physera. What follows are highlights from their conversation.

ADI: Let's start by discussing some recently announced healthcare news: Teladoc announced its acquisition of Livongo for more than $18 billion. What are your thoughts on that deal?

SEAN: It's a massive validation for a virtual approach to health. It's a statement of the times that the deal of healthcare everyone's talking about this year is a deal involving digital care. At Omada, the motto/mantra we've long held is that in-person healthcare is option B. We are thinking about ways to increase value, affordability, and experience by delivering services from afar. This merger is a huge validation of that. It is where healthcare is going.

Ahead of COVID-19, I thought it would be a 10- or 15-year journey to get there. In March, basically overnight, hundreds of millions of Americans started to ask themselves, "Can I get care without having to show up in a doctor's office or without having to sit in a waiting room?" And if you think of the dominoes it triggers, these individuals are asking their health plans and/or their employers, "What offerings do you have that can support this need?" COVID-19 is tragic in so many ways. We can all hope we end up with a better healthcare system because of it.

ADI: Dan, what kind of uptick did you see in your programs as a result of the pandemic?

DAN: We saw a tremendous uptick in interest in Physera and our offering. We had a huge increase in appointments with our providers. It's very hard for us to decouple organic growth, simply because we're growing very fast and adding new customers every quarter from growth due to COVID-19. Since the second quarter of 2020, there's been a step-function increase in our business — even when taking into account existing customers.

> "

We had a number of health plans that we had been courting for months — if not years — all of a sudden calling us, asking to meet next Tuesday.

Dan Rubenstein

Our program is completely virtual. We had a number of health plans that we had been courting for months — if not years — all of a sudden calling us, asking to meet next Tuesday. It was a huge acceleration — both from the patient and the customer side — for our company. It's borne out to be a better way of doing care as a frontline treatment. You don't need to go in person, with concerns about exposing yourself to COVID-19. Having the ability to access care from the comfort of your home and getting expert advice from a specialist is valuable for people. They really appreciate having that.

ADI: How much of this growth do you think is tied to a point in time versus it being an actual transformation that's here to stay? Will this uptick in usage of digital health services be sustained post-COVID-19?

DAN: When you look at an industry like telecommunications, for example, certain countries in the world didn't have landlines, and they essentially skipped that whole infrastructure of landlines once mobile came out. There's no reason for them to go back and implement landlines now.

Similarly, now that we've seen the power and the capability of telehealth, it will be here to stay — even after the crisis has passed. It's not going to replace in-person care. It's going to continue to augment it. But, having it as a first-line treatment makes a lot of sense. We will see a structural shift. This crisis has made it possible for people to get comfortable around it across the ecosystem — patients, providers, and payers. We're hopeful payers will continue to pay for it long after the crisis has passed.

ADI: What was it like building and implementing a physical therapy app?

DAN: The basic form of our app was very quick. We had an app out to the market within six to nine months from when we started. And of course, we've iterated and improved it over time. But the harder thing we're building is a nationwide network of licensed clinicians to provide care that the infrastructure needed.

SEAN: These are difficult operational and technological offerings to create. They involve a blend of people, regulations, and licensure technology, across many dimensions.

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You can't just give a physical therapist Zoom, say, 'Go,' and have them deliver effective care.

Dan Rubenstein

DAN: On the compliance side, what we do is a lot more than just give a clinician Zoom, right? You can't just give a physical therapist Zoom, say, "Go," and have them deliver effective care. So over the years, we have developed a compelling, deep program that leverages the technology of televideo chat. But at its core, there are things you do differently when providing telehealth than you would do in-person. This isn't something they teach you in schools.

ADI: **What is your goal regarding your mission to continue driving the transformation of in-person care?**

DAN: Our goal is not to replace in-person care. Our goal is to augment it — and by doing that, making the whole system more efficient. As a country, the US is spending so much money on healthcare. And we're not getting the best results. There's a misallocation of resources here. So, having a better front end for the patients who need that level of care will free up resources for other patients who need deeper care.

I don't see our mission as being about having to do everything digitally. That doesn't make sense. Ultimately, you will need to have both good digital care and good in-person care: Use the digital solution where it's appropriate, and have in-person available for those people who need it today. I feel like we're building a new world.

For the full conversation, please listen to our Oliver Wyman Health podcast.

AUTHORS

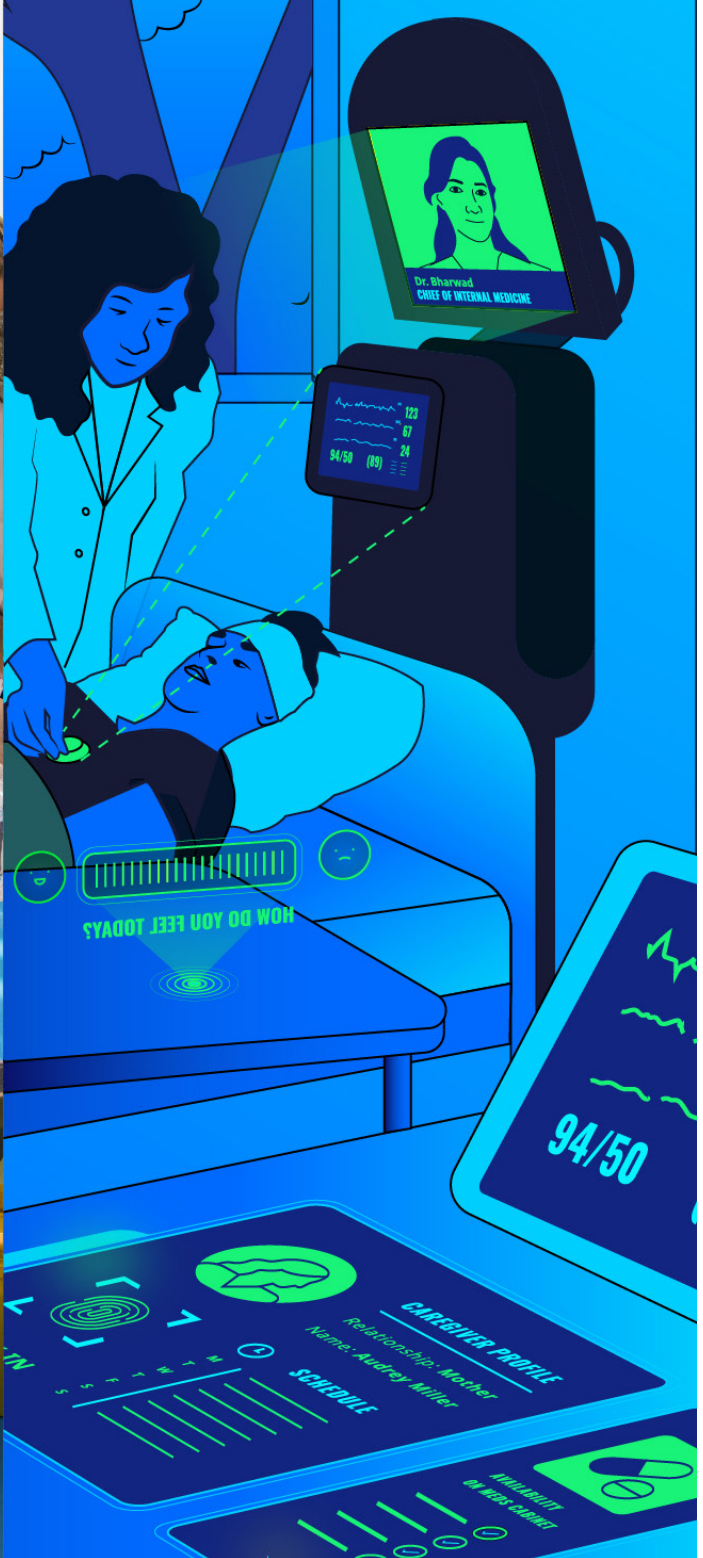**Sean Duffy,** Co-Founder and CEO, Omada Health

Dan Rubenstein, Co-Founder and CEO, Physera

Aditya Lingampally, Principal, Health and Life Sciences, Oliver Wyman

Ashley Smith, Partner, Health and Life Sciences, Oliver Wyman

Patrick Barlow, Partner, Health and Life Sciences, Oliver Wyman

WORKING IN THE NEW ECONOMY

The events of 2020 so far have catalyzed what we already knew we were capable of doing in healthcare. Symptom checks powered by artificial intelligence (AI) for COVID-19 have resulted in marked reductions in urgent care and emergency room (ED) visits. Virtual visits have entered the mainstream.

Patients are not the only ones who appear to welcome this change: Consumers seem to appreciate the ability to receive care where, when, and how they desire, as opposed to taking a half-day off work to see their doctor; likewise, clinicians and other healthcare workers appreciate the flexibility and efficiency that working from home affords them. Virtual and AI-powered care delivery not only means we need fewer exam rooms, fewer on-site staff, and less parking. It also means the work itself for doctors and nurses may look different and will require new ways of thinking about human capital planning.

Although new mindsets and new approaches don't come in the same box the telehealth software came in, they will drive real value. We already see that heretofore near-impossible techniques — such as asking a patient via video chat to go into their medicine cabinet and show a doctor what pills they're taking or opening the fridge to show their physician what foods they're eating — are transforming care delivery.

As the work of care delivery is transformed, so too must the workforce — and achieving that is akin to solving a large, complex puzzle. Consider, for example, that labor costs typically represent approximately half of a hospital's operating budget. Forward-thinking leaders are using the pandemic crisis to reconsider staffing models that address long-standing challenges related to physician burnout and staffing shortages.

But implementing more efficient and flexible staffing models is only part of the answer. At the same time, healthcare leaders must develop broader skillsets — both across leadership teams and throughout their greater organizations — in order for new ways of working to take hold. The need to collaborate across traditional boundaries — already a present challenge — will only increase as the technology available to assist in patient care becomes more sophisticated. Leaders who pivot their operating models will position themselves to make it through the current crisis while emerging in a stronger position to compete on talent compared to where they started.

JOURNEYING FROM THE OLD WORLD OF HEALTHCARE DELIVERY TO THE NEW WORLD

Healthcare leaders recognize that in the post-pandemic world, connecting a clinician with a patient or a patient's caregiver is only the first leg of the journey. The next stage, which we are already starting to experience, is to deliver better outcomes — enabled by changing the scope of what care people receive, where they receive it, when they receive it, and how. To achieve that, healthcare leaders must reimagine care delivery at its core. And, they must intentionally build the skills required to lead and sustain this slanted approach.

HEALTHCARE'S FUTURE IS HERE, AND IT LOOKS DIFFERENT

Leaders are often too busy solving the problems of today with yesterday's tools, failing to recognize that the promise of the future is right here, ready and waiting.

When a patient with congestive heart failure, for example, wants to consume less sodium, why not virtually open her fridge alongside her and explain why certain food items may be an unsound dietary decision that can be replaced with something similar, but healthier? Telehealth formats like this exist but are still fairly novel for most patients. Patients should think of telemedicine not merely as a way to "order" more medicine, as if the physician were a vending machine, but to consult with their doctor about their bigger medical concerns.

Now is the time to change our workforce actions and implications. But even with the ability to upgrade the very systems that have long plagued us, we remain stuck in an old and inefficient labor model. This is due in part to an executive focus on recruitment, rather than on changing culture and processes in ways that better realize the full benefits of new technologies.

As the healthcare industry and the world both become more virtual, home-based telehealth care models and in-home self-administered labs have seen marked recent growth. But shifting to these models is deceptively complex. Doing so requires a flexible workforce with new skills, staffed at different times and in different locations, with new supporting tools and infrastructure. This will not occur in isolation from the traditional operating model, which will see a reduction in its utilization and new expectations for flexibility and coordination with new models. That requires new hiring, training, and compensation approaches that don't come in the same box the telehealth software came in.

New hiring, training, and compensation approaches don't come in the same box the telehealth software came in

Take the increased relevance of cybersecurity risks, for example. Over on the dark web, healthcare records sell for up to 20 times the price of credit card information. As the volume of tools and devices increases, a standard, repeatable approach is necessary to bring new technology into a healthcare ecosystem that provides both information and physical security across any location — while facilitating the user experience for expert care providers, at-home caregivers, and patients. The typical traditional health system organization lacks that capability. Leaders must ask: How can my team come together to keep consumers safe while making the most of what new technology can offer?

On the dark web, healthcare records sell for up to 20 times the price of credit card information

HEALTHCARE LEADERS' NEW PERSPECTIVE IS FORWARD-FACING

Leadership teams that truly harness the value made available by technology, AI, increased appreciation for diversity, the increased desire for delivering and receiving remote care, and so on, will do three specific things differently compared to those who don't. (And this shift will make all the difference.)

Those who harness this kind of value will respect, yet also welcome with open arms, the blurring lines among typically siloed functions that can do more by working together — such as information technology (IT), cybersecurity, building and facility security, and medical quality.

There are practical ways to foster, and insist on, this type of collaboration. Share ideas and data transparently and broadly across the organization. Ask to see customer-focused analysis to support decisions. Encourage trials of new, cross-functional approaches. Be willing to take risks, so long as there is a mitigation plan in place from coordinated roles across the team. Defining and transparently reporting success metrics will help ensure stronger ownership and better execution. Above all, establish the norm that not every new effort needs to succeed and scale up on the very first attempt. An important focus is to innovate beyond traditional restrictions. Some ideas will require multiple revisions to work. Others will be shut down, with due credit given to applied efforts and learnings that can be carried into the future.

Those who harness this value will increase their ability to effectively lead and manage a workforce with diverse sets of skills and backgrounds.

As a result, they'll better serve their populations' varied needs and expectations. Consider that inclusive leaders behave differently. They ensure the meetings they lead encompass a full range of perspectives. They actively talk about inclusion as part of their business-as-usual conversations. They give everyone in their orbit — including

those in teams who don't directly report to them — detailed and actionable feedback about how to improve and truly thrive. They challenge themselves to partner with new people over time — rather than defaulting to what's comfortable or familiar. When an urgent piece of work comes up, they don't automatically lean on the one person they feel most comfortable with. These kinds of behaviors — which are not necessarily innate, but rather skills that can intentionally be built and honed — bring new ideas, questions, and solutions to the forefront.

Apply the transformation mindset to the care provider experience as much as the patient experience.

Physician burnout and overall well-being have plagued the industry for decades, and the tide won't turn without deliberate effort. The care provider experience and feedback must be included as important metrics in any effort. If conducting video appointments from home allows a practitioner to avoid her commute time, she'll gain back an average of an hour per day. Other key benefits of this workflow include better day-to-day job flexibility, more quality time (and also time in general) caring for patients, and a healthier overall work-life balance.

We are just starting to see the future of healthcare's thriving workforce — and the future of those who best lead it — materialize. The promise of the future is right here, ready and waiting. Let's seize it.

AUTHORS

Deirdre Baggot, PhD, Partner, Health and Life Sciences, Oliver Wyman
Amanda Evison, Partner, Health and Life Sciences, Oliver Wyman
Elizabeth Southerlan, Principal, Health and Life Sciences, Oliver Wyman

AI WILL HELP US HEAR OUR BODIES

Here's something you might think is science fiction but is a hard medical fact: Artificial intelligence-based (AI-based) applications can now listen to one single heartbeat and detect congestive heart failure (CHF) with 100 percent accuracy. It's not a stretch to imagine that the dreaded nightmare of ending up in an emergency room (ER) on a gurney has now morphed into a new reality — one where you can proactively detect CHF and then walk into your doctor's office to discuss options for managing it.

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Prevention in this way is powerful. Yet, it has proved elusive for many reasons. None are more telling, perhaps, than the inability to continuously listen and harness our bodies' voices and messages.

Preventative services constitute three percent of overall US healthcare spend. Almost 75 percent of all healthcare spend is tied to treatments for patients with chronic conditions. These figures trend even higher for publicly funded programs — as high as 83 percent for Medicaid and 96 percent for Medicare.

We expect AI will significantly enhance our ability to proactively and accurately detect the likelihood of acute events for a patient with chronic conditions and minimize expensive and unnecessary ER visits or hospital admissions. We also expect it will transform chronic care, prevention, and waste.

THE INCOMING DATA UBIQUITY

Access to appropriate, real-time data is crucial to enable early detection of acute events for chronic patients. Historically, this requirement has been addressed in a limited capacity through sporadic lab tests that yield results at given points of time — results that are inadequate from a prevention standpoint. For example, asthma patients who typically visit a primary-care provider every three months spend more than 2,000 hours between visits where their symptoms aren't actively monitored. As a result, providers evaluate symptoms for a fraction (less than 0.1 percent) of the patient experience to understand and manage conditions. Moreover, electronic health records are notorious for incomplete and/or inaccurate information that is limited to provider interactions during visits.

With the ability to amass and process large data volumes through cloud computing, we're finally at an inflection point where AI applications will bridge this gap, enabling ongoing monitoring of patients with chronic conditions. The missing component to feed AI applications — access to real-time data — will be addressed through the widespread proliferation and adoption of wearable devices. Here are three key drivers:

~75%

healthcare spend tied to treatments for patients with chronic conditions

Ubiquitous data. Here, data goes beyond traditional medical records and claims. Access to real-time data is gathered through monitoring, wearable devices, and individual gene and behavioral profiles — the last of which is growing.

Quickly advancing computing. Computational power to train AI models has doubled every 3.4 months since 2012.

Consumer expectations. As AI applications assume a prominent role in the early detection of acute events for patients with chronic conditions, we envision a gradual shift in cost and utilization patterns. This is especially true for where and how care is delivered. For example, the National Institute of Health in the United Kingdom launched an initiative to integrate AI for the early detection of chronic conditions, with the aim to eliminate nearly 30 million unnecessary outpatient visits and save close to £1 billion over the next five years. The greater objective, along these lines, is to optimize cost and utilization and reinvest scarce clinical resources to frontline care.

> Computational power to train AI models has doubled every 3.4 months since 2012

WHAT AI INSIGHTS WILL IMPACT CHRONIC CARE MANAGEMENT THE MOST?

We analyzed the primary source of insights currently deployed for the detection of acute events for patients across the five most prevalent chronic conditions in the US. These include diabetes, hypertension, respiratory disorders like asthma and chronic obstructive pulmonary disease (COPD), CHF, and depression.

EARLY DETECTION WILL REDUCE ER AND HOSPITAL UTILIZATION

As a result of the above shift, significant cost savings will be generated. Recent studies, for example, estimate this opportunity tops $8 billion annually.

To affect this transformation, we expect to see an evolution of business models across all major stakeholders in the healthcare ecosystem. Regardless of who the stakeholder is, the ability to ingest different types of datum while managing the data's privacy and security will become table stakes.

The evolution of existing business models to integrate and deploy AI insights meaningfully will determine how effectively we pivot to prevention from treatment to manage chronic conditions.

This advent of powerful AI-driven insights and preventative opportunity isn't just incremental. As an addition to the toolkit clinicians have used to understand patients and their conditions, it also will enable entirely new processes and businesses that have the potential to disrupt and drive new industry value.

Exhibit 1: The Future of AI's Treatment and Prevention Potential

Condition	Current source	Future source
Diabetes	Mostly retroactive insights derived from lab tests (like A1C tests) or self-service devices like blood glucose meters	Real-time blood glucose level monitoring and of other critical health metrics to titrate the appropriate insulin dosage based on individual health profiles and historical symptoms
Hypertension	Periodic blood pressure screenings primarily through cuffs or self-service devices Limited adoption of wearable devices (for example, QardioArm) which are yet to be fully integrated into detection and response ecosystems	Data from wearable devices used in conjunction with multimodal data sources (like genomics or behavioral) detect abnormalities to mitigate acute episodes
Asthma	Regular office visits to conduct pulmonary function tests Adhoc monitoring of environmental factors (like air quality) which may lead to exacerbation of conditions	Longitudinal analysis of pathophysiology, natural history, phenotypes, seasonality, genetics, epigenetics, environmental monitoring (like the air quality index) and disease biomarkers of the disease[1] Devices such as pulse oximeters to measure blood oxygen level and heart rate
Congestive Heart Failure	Clinically delivered diagnostics (for example, ECG) triggered by emerging symptoms Proactive identification driven by factors such as hereditary prevalence and lifestyle (like stress)	Ability to accurately detect heart rate variability through raw electrocardiogram (ECG) to identify early onset of CHF. In fact, AI applications have achieved 100 percent accuracy in detecting early onset of CHF through analysis of a single heart beat[2]
Depression	Diagnosis largely reliant on subjective answers to survey questions Cognitive behavior therapy to evaluate root cause and manage symptoms	Detect symptoms of depression through voice patterns, 3D facial expressions, and online behavior[2] Interpret brainwave patterns unique to individuals with depression to identify improvement in symptoms based on specific treatments[3]

Sources: 1. PulmonologyAdvisor, Severe Asthma: Harnessing Biomarkers to Power Treatment Effectiveness; 2. ScienceDaily: AI neural network detects heart failure from single heartbeat; 3. MIT Technology Review: Our smartphone's AI algorithms could tell if you are depressed | Headway, Ginger Website: Why We Created the First AI-based Behavioral Healthcare System

FIVE PREDICTIONS REGARDING AI'S HEALTHCARE IMPACT

1. Providers will be at the forefront of deploying AI capabilities to drive the pivot to preventative care for chronic care management. We expect significant innovation in this space. AI service providers will disrupt traditional business models focused on an incremental approach for care model-design improvement.

Integrating AI application within patient and provider workflows will become critical as AI takes on an increasingly active role in monitoring, evaluating, and diagnosing chronic conditions and providers concentrate on care planning and treatment.

ER utilization will be restructured to focus almost entirely on acute care and trauma victims, as AI-based applications minimize frequent and unwarranted ER visits. We expect a dramatic shift from exacerbation-related inpatient admission for patients with chronic conditions. As evaluation and diagnosis are separated from care planning and treatment, a significant proportion of services will be rendered through virtual channels.

> **Providers must ask themselves**
> How aggressively should we incorporate change? Should change just be additive? Or, does change allow for entirely new care models?

2. Innovators will complement — and, in some cases, supersede — traditional providers. We expect to see that partnerships between providers, payers, and employers will end up producing a wide spectrum of business models. We also expect a greater emphasis on serving consumers directly.

We're already witnessing a proliferation of AI-based health applications. In fact, the latest version of the Apple Watch — to be released in late 2020 — includes applications for tracking heart rate, detecting irregular heartbeats, and capturing an electrocardiogram. The advancements over the next decade will be a parallel effort with two tracks. The first track is the continued design and development of AI-based platforms. The second track is about developing business models to deploy these platforms into the mainstream healthcare value chain to be adopted by all healthcare stakeholders. Consumers are already at the forefront of adopting wearable devices. However, translating these insights into appropriate responses will require clinical inputs and collaboration with providers. On the other side, innovators will need to collaborate with payers and employers to reimburse or finance these applications.

> **For innovators — especially if providers are slow to adopt — ask**
> What are our opportunities to establish AI-driven stand-alone service models that consumers can access?

3. Life sciences and pharma will see significant improvement in the lifecycle of the research and development of drugs and therapeutics as AI accelerates clinical trials. Digital therapeutics will complement, if not replace, traditional medication therapies.

Pharmacy benefit managers have already incorporated digital therapeutics into their formulary for chronic conditions, such as diabetes and depression. Although it requires efforts upfront to develop medical policies and procedures for the review and authorization of such digital therapeutics, we're already witnessing an uptick in adoption, with hundreds of thousands of patients leveraging digital therapeutics from AI-services providers such as Livongo, Omada, and SilverCloud.

> **For life sciences and pharma leaders, ask**
> Which digital therapeutics will truly drive value for patients? How do we prioritize? Because digital therapeutics — unlike traditional therapeutics — have a much shorter lifecycle for research and development, how and where should we prioritize the development of digital therapeutics?

4. For payers, AI will transform care delivery for members with chronic conditions and optimize network performance and clinical outcomes in a differentiated way.

New products and benefits will incentivize members and providers to adopt an AI-driven ecosystem (such as wearable devices) for monitoring and mitigating chronic health conditions and encouraging people to embrace healthier lifestyle choices. As AI improves diagnosis accuracy, it will reduce the overall risk of managing patients with chronic conditions. As a result, we envision a wide array of condition-specific subscription models. Alternative financing and funding mechanisms will emerge.

Regarding prior authorization, existing care guidelines will be supplemented by AI-driven, real-world evidence due to which manual review will be eliminated with minimal exception.

Regarding networks, what we consider provider networks will expand beyond clinicians, physicians, or typical ancillary-services providers (such as vision and durable medical equipment) to include AI-powered care models. AI-based service providers will be part of provider networks, warranting the need for new payment models and contracting requirements. Providers will be incentivized to refer patients to AI-based service providers.

Regarding risk management, new regulatory policies and risk management frameworks will mitigate liabilities tied to AI-driven decisions. This will enable differentiated underwriting and reinsurance approaches for payers with superior views of patient exacerbation risk.

The new Apple Watch includes applications for tracking heart rate, detecting irregular heartbeats, and capturing an electrocardiogram

5. Employers will see a wide array of options to contract with stand-alone service providers who offer AI-driven platforms and products to influence the quality of cost and care for chronic patients.

Regarding benefit redesign, the emerging AI-based service providers who partner with employers will mature. We will witness the widespread proliferation of these providers across the care continuum.

Regarding joint data ownership, employers will seek access to a wide range of member data gathered through wearable and monitoring devices to aid the mitigation of costs for chronic care management. In return, employees will receive incentives to adopt these wearable and monitoring devices and allow employers access to their personal health information.

AI must be viewed as a counterpart to existing resources

Employers should ask the following questions
How do we incorporate these AI-driven platforms and products into our employee benefits structure? Which key platforms and products are most relevant for our employees? How do we source these?

IDEAL FUTURE PERCEPTIONS OF AI

Given its potential, it's inevitable AI will play a dominant role to help prevent acute events for patients with chronic conditions. However, given that the ability to harness AI's potential and capture value is also so vast, that's inevitable, too. It's more about who will capture the most value out of this opportunity.

Transformation requires a concerted effort beyond data and technological capabilities. Change will involve a significant mental shift for both patients and providers to trust and integrate AI insights for early detection and diagnosis. AI must be viewed as a counterpart to existing resources. Above all, a holistic regulatory framework must be established to address privacy and security guidelines. AI transforming the art of prevention is no longer a matter of "if" but "when."

AUTHORS
Charlie Hoban, Partner, Health and Life Sciences, Oliver Wyman
Tom Mikuckis, Partner, Health and Life Sciences, Oliver Wyman
Rahul Ekbote, Principal, Health and Life Sciences, Oliver Wyman

LESSONS FROM FINANCE ON DATA SHARING

The global financial crisis of 2008 to 2009 triggered a major restructuring of the finance industry. What emerged a decade later was an industry where data sharing was not only table stakes, but also a major driver of innovation that put customers in the driver seat of their data. Fintech innovation touches nearly every part of the industry, and newer players such as PayPal are valued more highly than traditional banking firms are. Acquisitions by big firms (such as Visa's purchase of Plaid and Mastercard's purchase of Finicity) signal the shift in power: from siloed to free-flowing data across the ecosystem.

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Several factors drove this transformation in finance and inspire us to think about how we might enable a similar future in healthcare: (1) consumer-first thinking and innovation, (2) self-regulation working alongside more formal supervision to foster growth, and (3) favorable economics of digitization.

CONSUMER-FIRST THINKING

The financial data-sharing boom began when smaller players developed a foothold with unassuming services (such as PayPal), which served as Trojan horses for more broad-scale sharing of data. How and why did this happen?

Upstarts typically targeted markets underserved by traditional banking by focusing on a specific consumer need. The Mint app, for example, enabled consumers to monitor all their financial accounts on a single site and set goals. More recent examples include the targeting of Millennials (for example, with Robinhood) or other startups (for example, with Brex). Their limited product/market offering enabled them to focus sharply on consumer needs and convenience. Incumbents were happy to share data with these new players because they saw potential benefits for their customers and little threat to their core businesses. By the time they became wise to the threat, the innovators were entrenched in the hearts and minds of consumers and impossible to ignore.

At the same time, technology waves have fueled growth. The Internet boom allowed PayPal to grow along with the explosion of e-commerce. More recently, we've seen a recent wave of fintech innovation driven by cloud computing, which lowers investment costs and allows businesses to scale quickly. Startups can embrace these technologies more quickly than incumbents can, thus growing more nimbly and with significant cost and structural advantages.

The 2008-2009 financial crisis triggered a major restructuring of the finance industry

The tipping point came in the early 2010s. Consumers became accustomed to providing their credentials to fintechs (such as Plaid), giving them access to data that previously existed only within banks. This resulted in the rapid expansion of consumer adoption and a boom in venture capital funding for fintech starting in 2014. At first, banks resisted, but eventually acquiesced. In 2015, several major financial institutions restricted access to data aggregators claiming unmanageable loads on their servers and the risk of security breaches. The Consumer Financial Protection Bureau (CFPB), empowered via the Dodd-Frank Act with regulatory authority, voiced support for data sharing but held off on regulation, encouraging both sides to collaborate. Partnerships between financial institutions and fintechs emerged out of a growing realization among incumbents that it could improve their value proposition to consumers.

> **The healthcare perspective**
> Is there a parallel in healthcare today, or on the horizon? Is there a path forward that challenges incumbents' power? What creates the tipping point?

The primary driver of fintech data sharing was a clear demand signal by consumers, via the fintech innovations they use, to reduce administrative frictions. Fintech players rapidly embraced this, solved transactional consumer hassles, and moved on to begin helping consumers with their needs directly, without being asked. For example, setting aside money into a savings account to help consumers reach a goal.

In healthcare, despite our best intentions at being "consumer-centric," healthcare is more complicated due to the B2B2C (Business-to-Business-to-Consumer) nature of transactions and funding, meaning many who are solving consumer hassles are serving multiple masters and trying to achieve multiple objectives. The (hopeful) parallel in healthcare would be services targeting the consumer directly; for example, the emerging digital-first telemedicine offerings that are untethered to their physician office. By targeting these services (ones consumers choose and pay for), incumbents and innovators alike have the opportunity to follow consumer demand signals more directly.

Separately, an interesting development in fintech was the rise of Plaid and its peer networks of trusted API-enablement (application programming interface-enablement) platforms, as opposed to API extensions built by the legacy ERP (enterprise resource planning) systems that served banks or managed much of the underlying data assets. By satisfying consumers' demands for convenience, such as integrating multiple accounts in a single place, these API services assumed a stronger power position in the flow of information. Will we see the emergence in healthcare of a marketplace of private, trusted API-enablement networks that are laser-focused on making this capability work for both parties — consumers and health data stewards? Or will we continue to see a mixture of modest apps and electronic health record (EHR) platforms to serve this need? The emergence of such data stewards with a compelling value proposition to consumers is a gap the industry has yet to fill and has significant potential to be a tipping point for the industry.

The primary driver of fintech data sharing was a clear demand signal by consumers to reduce administrative frictions

ALLOWING SELF-REGULATION TO WORK

We have seen the financial services industry collaborate on data and not wait for regulation to mandate action, enabling incumbents to better control their destiny. How and why did this happen? What dynamics make it a sustainable equilibrium today?

There's a long history of data sharing going back almost three decades when seven major financial institutions came together to launch early warning services to prevent fraud associated with bank accounts and payments. This environment of open data exchange allowed the emergence of new players where financial institutions themselves were the customers. By solving connectivity between consumers and banks, data aggregators allowed other startups to focus on their products. New players are emerging to help establish a common digital identity (such as Onfido, Payfone, and ForgeRock). Providing authentication products to banks could help lower compliance costs and reduce exposure to regulatory risk. For example, in Asia Pacific, the startup Thought Machine [provides](#) cloud-native core banking solutions and counts Lloyds and Standard Chartered as clients.

The post-crisis growth of regulation (for example, Dodd-Frank) triggered a shift from "lean back" to "lean forward" on the part of all players. Rather than wait for regulators to come at them and be on their back foot, firms found it best to move forward with self-regulation and be on their front foot. We see continued efforts for collaboration currently. In October 2018, OFX evolved into a new initiative called the Financial Data Exchange (FDX), focused on promoting a standardized API for consumer data. It has over 130 sustaining members.

> **The healthcare perspective**
> Why hasn't healthcare been able to do this? Is there too much regulation in place today? What is missing to better emulate what financial services have achieved?

This is the $2 trillion question. Perhaps it is a function of fragmentation. In banking, you often retain a core checking account but add fintech services to deliver added value. In healthcare, such data services might lower incumbent revenues, what is often defined as "leakage" or switchers. There are few national players, and services are typically delivered in person. The underlying technology infrastructure in healthcare reflects this real, physical fragmentation as well. Finding one access point in finance opens up a broader network of consumers and transactions. Healthcare, in contrast, is limited by the reality that each door is its own bespoke door: deploying a consumer-oriented solution with one provider does not confer the same scale benefit that it would in finance.

Further, healthcare regulation was designed to meet Meaningful Use criteria, not to enable new activities, per se. The result was a "compliance only" exercise rather than solving consumer hassles through data interoperability and sharing. Today in healthcare, many standards are not applied or adopted evenly. As an example, the

standards community finalized a standard for appointment scheduling, potentially making access to physicians easier and creating a role for a host of incumbents and intermediaries to solve a big hassle in the consumer experience. This standard has not been adopted. Ultimately, it is a business model problem, not a technical one or a question of regulation, given that both industries share similar regulatory frameworks. Framing the regulatory challenges in this light — a business problem — produces different solutions, different areas of focus, and potentially different partners and partnership approaches for data sharing and interoperability going forward.

> **Payers and providers must think hard about their role and how they create value for consumers**

FAVORABLE ECONOMICS OF DIGITIZATION

Data sharing can be enabled through a multitude of models, from data aggregation (such as Plaid, Yodlee, and MX), to interoperability through the use of APIs. What enables successful data sharing in financial services?

Having a clear focus on consumers with specific use cases is the first factor — as discussed above. Banks collaborated with fintechs in large part to differentiate themselves in a digital environment in which banking products differ mostly on price. This focus on the consumer has become a common motivation among all stakeholders and led FDX to develop its five core principles of control, access, transparency, traceability, and security.

Experimentation with collaboration models is the second factor. Collaboration and agreement across multiple stakeholders take time. FDX is the next-generation version of OFX, which dates back to 1997. The industry continues to see bilateral actions. For example, in January 2017, JPMorgan Chase and Intuit (Mint) signed a data-sharing agreement. In February, Silicon Valley Bank and Xero made a similar move. In April, Wells Fargo's arrangement with Finicity is the third such agreement.

> **The healthcare perspective**
> Are there emerging models for data sharing in healthcare? How can the economics accelerate new models? How do we get started?

The hint of an approach lies at the intersection of the Centers for Medicare & Medicaid Services (CMS) and the ONC (Office of the National Coordinator for Health Information) interoperability rules. While most industry attention is focused on $1 million "information blocking" fines, a viable path forward is for health plans (and potentially other actors) to begin offering consumers "data aggregation" services akin to those offered by Plaid and other fintechs. This is implied as the CMS interoperability and patient access rule compels plans to deliver both clinical and financial information to fulfill patient access API requirements.

If I am running a plan and envision collecting more and more clinical data — either for value-based care contracts or to administer prior authorization and other digital transactions — why wouldn't I start with a default option for all of my members to aggregate their records, share them with the plan, and simplify their lives? The regulation allows for consumers to control more of their data and for incumbents to make it available in machine-readable formats. The power of this approach is that it puts the focus on consumer need rather than data integration. Payers and providers must think hard about their role and how they create value for consumers in this light — lest someone else grab the consumer relationship.

AUTHORS

Aneesh Chopra, President, CareJourney
Chris Schrader, Partner, Health and Life Sciences, Oliver Wyman
Rick Chavez, Partner, Financial Services, Oliver Wyman
John Petito, Principal, Health and Life Sciences, Oliver Wyman

DECODING OUR FUTURE

Genomics is evolving from niche to center stage. Harnessing the capabilities of genomics will change the fabric of everyday life and will disrupt business models of payers, providers, and pharma alike — while creating new markets for next-generation prevention. When it comes to the future of genomics, we don't have a crystal ball. Or do we?

In 2012, we posited three waves of healthcare transformation would emerge between then and 2025. Wave 1 would focus on patient-centered care and population health management. Next, Wave 2, would be about consumer engagement and the rise of the quantified self. By 2020, we posited that Wave 3 would bring forth the science of prevention. Imagine, we said, a $100 saliva-based genomic-sequencing test available in 50,000 retail health stores. Or a mobile app or avatar that navigates your health profile.

It's now 2020 and genomics is indeed facing an inflection point in medicine and society. The cost of sequencing has dropped from $95,000,000 in 2001 to $300 in 2020 — poised to reach $100 imminently. Genes can be edited in days instead of months, thanks to the discovery of the CRISPR/Cas9 genetic scissors by Emmanuelle Charpentier and Jennifer A. Doudna, recipients of the 2020 Nobel Prize in Chemistry. Fifteen countries have invested $13 billion in sequencing initiatives. Governments and health systems will have soon sequenced millions of people. As of Fall 2019, 20 gene therapies have been approved, with thousands currently in clinical trials for previously incurable conditions such as sickle cell anemia.

Consumers are demanding it — genetic testing is growing 10 to 12 percent annually and is projected to reach $30 billion by 2026. And providers are responding — over 80 percent of health systems, for example, have either instituted genomic data management strategies, or plan to do so within the next two years.

However, a key barrier of genetic medicine is the limited number of consumer access points. Professionals who specialize in the interaction of genes and health are few, with about 4,700 genetic counselors and 1,240 medical geneticists certified to provide care in the United States. Telemedicine could relieve this pain point, making access more fluid for the average consumer. Companies like Genome Medical, for example, aim to expand the genetic specialist network via on-demand, virtual care delivered across the US.

>80%

of health systems have either instituted genomic data strategies or plan to within two years

Exhibit 1: Sequencing's rapidly declining costs will accelerate global adoption
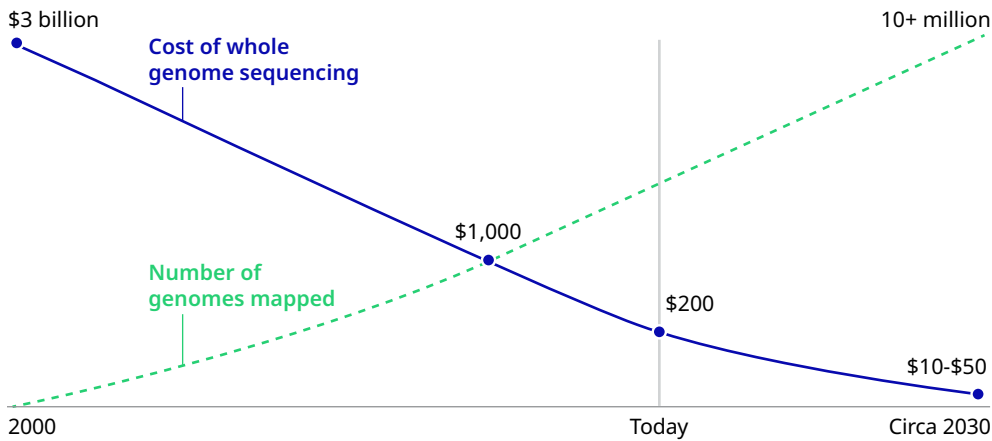
Source: Oliver Wyman analysis

CURRENT APPLICATIONS AND FUTURE EFFORTS

The mass affordability of sequencing enables a paradigm shift from sequencing only those with risk factors (such as someone's family history or medical symptoms) to sequencing proactively to identify risk factors. It will allow every individual to build up genomic data capital, opening the door for new applications and business models across health insurance, care delivery, and everyday life.

Current efforts are focused on discovering genetic disease causes and on diagnosing, both with the aim to optimize treatment. Genomics has already become the standard of care in several niches: diagnosing monogenic congenital diseases, genotyping tumors using tailor-made gene panels, and developing treatments using genetic techniques including viral vectors, Chimeric antigen receptors (CAR T-cells), and CRISPR-Cas9. Genomics has transformed the healthy lifespan and early diagnostics (such as liquid biopsies) for cancers such as B-cell lymphoma, pediatric acute lymphoblastic leukemia (ALL), melanoma, and genetic diseases such as spinal muscular atrophy and retinal dystrophy.

The next decade will bring a major transition from treatment to prevention. Pre-implantation diagnostics and carrier screenings will be widely used to avoid congenital diseases and will unlock a far larger data capital. The number of drugs where pharmacogenomics can improve their safety and efficacy will proliferate (such as aspirin, which increases rather than reduces the cardiovascular risk for some genetic variants). The market for genetics-powered wearables and digital tools will explode, as they can enable consumers to make personalized everyday decisions (such as a wristband that provides a red, yellow, or green indicator for

The mass affordability of sequencing enables a paradigm shift

every food purchase, tailored to the genetic signature of each individual). Through further advances in genomics, applications like these will be expanded, and costly diseases — like obesity, diabetes, and cardiovascular — to name a few, avoided.

SIX 2030 PREDICTIONS

First, currently established platforms (gene therapy, CAR-T, CRISPR/Cas9, and mRNA therapeutics, for instance) will be shown to extend healthy longevity in many more cancers, such as breast, prostate, and colon cancer.

Second, public health agencies will promote postnatal and prenatal genetic screening, with the potential to further boost the science behind genotype/phenotype interactions.

Third, electronic health records (EHRs) will become EHGRs, or electronic health and genetics records. Genetic data will no longer be reserved for the intellectual elite, with advanced but simplified user interfaces for the average consumer. Every primary care provider will need to provide genetic counseling.

Fourth, consumers will be comfortable with technology companies holding their genetic data. But, consumers will hold back from sharing data publicly due to the potential for genetic prejudices/exploitation. Genetics-powered wearables and digital tools flourish as they compete to be the user interface/user experience that consumers embed in everyday life decisions impacting nutrition, fitness, and lifestyle.

Fifth, insurance markets will be disrupted, as members with genetic information have the upper hand in risk assessment, compared to insurers.

Lastly, major service lines for healthcare providers (such as cardiovascular, renal, orthopedics, and oncology) will shrink as the population becomes healthier and diseases can be captured earlier through better diagnostics.

THE NEW GENOMICS WORLD

These possibilities are dependent on technology, on consumers wanting it, on payers recognizing value, and on tools being developed to make data actionable. Given the variance in healthcare systems around the world, there is no standard recipe to unlock the value of genomics. Markets must ask themselves: Who will own the genomic capital? Who will be able to build a business model around it?

Gene therapy, immunotherapy, and the like may transform the perception and definition of a treatment plan. That said, huge barriers could complicate progress — namely, the reality that some high-profile gene therapies cost upwards of $1 million — and insurance coverage is not guaranteed. The need to address sky-high costs is imperative, because the pipeline for novel genetic therapeutics is large and promising.

For pharma/biotech, the ecosystem is ripe and more personalized medicine and companion diagnostics are beginning to appear. However, therapeutic area and research and development (R&D) strategies must adapt, as the transition from treatment to prevention will reduce public health spending on chronic conditions and acute oncology. Frontrunners will harness innovations through R&D in prevention and will develop new business models that capture the value of improved health and longevity across the pharma/payer/provider/tech silos (such as cancer-care insurance products provided by pharma/payer partnerships to cover the entire shifting value chain in oncology).

For payers, this transitional period will lead to asymmetry in data and outcomes. With the rapidly declining cost of sequencing, it's easier than ever to make the return on investment (ROI) case, even if the benefits are accrued to different payers over the course of a consumer's lifetime. Winners will need to coalesce the technology and genetic counseling ecosystem that is essential to drive behavior change and enable members to avoid high-cost hospitalizations, chronic therapy, and wasted tests and treatments.

For health systems, the traditional high-margin service lines are losing profitability. CAR-T therapy, for example, has already reduced cancer treatment from six months of chemo to a two-week hospitalization. Genomic and regenerative technologies will be able to address polygenic conditions such as heart disease and arthritis. Genomics offers an opportunity to engage a consumer for life — yet, 77 percent of primary care physicians are not comfortable discussing genetic information with patients. Leaders will shift their capital investments away from chemo infusion suites, operating rooms, and catheterization labs. They will upskill their workforce and their technology to deliver genetic counseling and infuse genomics into care pathways and evidence-based medicine protocols.

We urge all healthcare stakeholders to prepare for the near future where genomics will decisively shift their business models. This may be a threat to existing business models — but, more importantly, it is also a step-change improvement in human medicine that we cannot ignore.

77%

of primary care physicians are not comfortable discussing genetic information with patients

AUTHORS

Lucy Liu, Principal, Health and Life Sciences, Oliver Wyman
Mario Metzler, Associate Health & Life Sciences, Oliver Wyman
Fritz Heese, Partner, Health and Life Sciences, Oliver Wyman
Sven-Olaf Vathje, PhD, Partner, Health and Life Sciences Oliver Wyman

CLIMATE CHANGE IS A HEALTH CRISIS

Climate change is a threat that looms large on the horizon — and yet it often seems to be a danger that will remain in the distance forever and will never catch up to us — until one day it does, just like COVID-19. Extreme weather events and trends such as higher temperatures and rising sea levels are raising the rate of death and disease, disrupting healthcare, and escalating costs. As climatic conditions move out of the **"Goldilocks zone"** in which species — humans included — evolved, the speed and scale of compounding effects may overwhelm societies, businesses, and governments around the world.

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The health and life sciences sector is part of the problem: If the sector were a country, it would be the fifth-largest emitter of greenhouse gases on Earth due to the production, transport, and disposal of products and services across the life sciences supply chain.

However, this sector is also a crucial part of the solution: It has the opportunity to mediate the health impact of climate change, and to minimize the harm and inequities for patients, staff, and societies.

A THREAT MULTIPLIER

Climate change is the biggest global health threat of the 21st century, a danger whose impact on health is complex and varied, as explored in the below chart. Climate change will exacerbate the burden of every major disease category: infectious disease, chronic disease, mental health, injuries, and deaths.

Environmental events and trends harm people's health directly and indirectly by altering complex and interdependent pathways — ones that are both natural and manmade (see exhibit). These pathways act as environmental, social, and economic determinants of health. For example, more frequent and intense storms can inflict more damage and injury — this is a direct result; they also can inflict more death by disrupting urgent and essential medical care — an indirect effect.
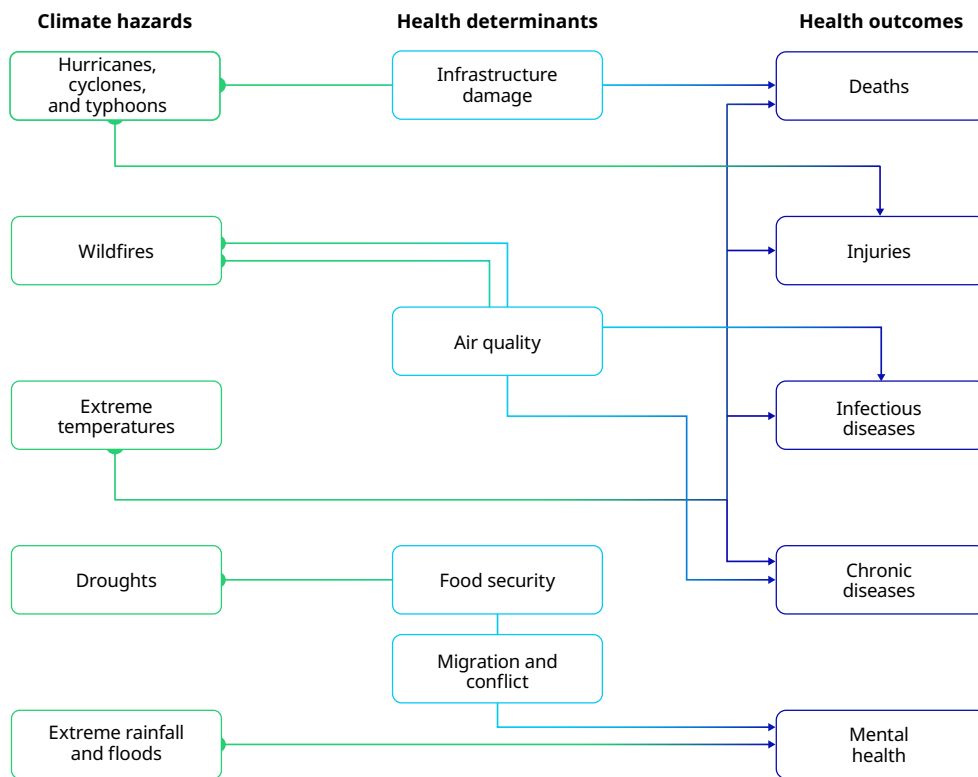
Climate impacts on health range from mild to severe and from acute to chronic. Wildfires and floods, for example, cause an initial spike in physical and mental health needs during each disaster, followed by a long tail of lasting poor health. Over time, this long tail amounts to multiples of the original surge in healthcare costs and productivity loss. Risks and outcomes once perceived as far off in time or space are unfolding. In time, they will intensify in both developed and developing countries.

Climate impacts on health range from mild to severe and from acute to chronic

Exhibit 1: Climate change is a health crisis

Climate hazards	Health determinants	Health outcomes

Climate hazards:
- Hurricanes, cyclones, and typhoons
- Wildfires
- Extreme temperatures
- Droughts
- Extreme rainfall and floods

Health determinants:
- Infrastructure damage
- Air quality
- Food security
- Migration and conflict

Health outcomes:
- Deaths
- Injuries
- Infectious diseases
- Chronic diseases
- Mental health

Note: This interconnections map is not exhaustive and does not aim to fully represent complex climate or meteorological processes. The examples present only a snapshot of the complex socioeconomic, environmental, and health interactions through which climate change is directly or indirectly affecting health across the world.

Source: Oliver Wyman analysis

Health and economic disparities are magnified by climate change, with the people and places the worst hit being least capable of coping. For example, the elderly, the poor, and people with pre-existing conditions face greater mortality risk during heatwaves. Rising temperatures and sea levels threaten both lives and livelihoods in tropical islands and regions, undermining their capacity to respond to catastrophes.

HOW CLIMATE CHANGE IMPACTS HEALTH AND WELL-BEING

Mortality risk will rise. More frequent and intense heatwaves will increase the risk of early death. Annual heat-related deaths could increase nine-fold in the US, from about 12,000 now to more 100,000 by 2100 in a high-emissions scenario. Besides the elderly,

others at greater risk are children, the poor, and those with pre-existing conditions. As the planet warms, intensifying cyclones and hurricanes are likely to bring stronger winds and rain — and disrupt hospitals and other healthcare providers. In the three months after Hurricane Maria hit Puerto Rico in 2017, for example, one-third of casualties may have died because medical care was disrupted or delayed.

People will experience more injuries. Hotter days are likely to increase the risk of self-harm and interpersonal violence. Hypotheses as to why this correlation exists range from climate-induced resource strain to people's varying psychological responses to heat. In a high-emissions scenario, there may be 9,000 to 40,000 more suicides in the US and Mexico by 2050, as well as an additional 3.2 million violent crimes in the US by 2100. Rising ocean temperatures degrade coral reefs that ordinarily dissipate energy from sea waves, weakening a natural defense against coastal erosion, storms, and floods in low-lying coastal areas. By 2045, in a business-as-usual scenario, severe coral bleaching could expose 26 million people across the Philippines, Indonesia, and Malaysia to injuries during storm surges.

Infectious disease will pose a greater threat. Climate change and air pollution act as risk multipliers increasing the risk of infection and death from respiratory diseases such as COVID-19. In the US, a small increase in long-term exposure to fine particulate pollution (PM2.5) is associated with an eight percent increase of dying from COVID-19. Rising temperatures are spreading existing diseases and releasing long-dormant plagues. Dengue could spread to the Southeastern US by 2050 as mosquito transmission zones expand from the tropics. Arctic heatwaves are thawing permafrost and could revive sleeping pathogens, such as bacteria and viruses that cause anthrax, smallpox, or the 1918 influenza pandemic.

> Climate change and air pollution act as reinforcers, increasing the risk of infection and death from respiratory diseases such as COVID-19

Chronic disease prevalence and related vulnerabilities will increase. Pre-existing conditions (for example, diabetes) and common medications, such as Angiotensin-converting enzyme (ACE) inhibitors, reduce the body's ability to cope with heat. As populations age and heatwaves become common, people may become more susceptible to dehydration and heat-related illnesses. Consider, for example, that short-term heat exposure spiked the relative risk of heart attacks in Germany from 1987 to 2014 — particularly for diabetics. As fire seasons grow longer and more severe, chronic ill health and significant costs related to smoke exposure are surging. In 2019, for example, the Black Summer bushfires affected 80 percent of Australia's population. Premature deaths and hospital admissions accounted for more than half of the total costs of the fires. Survivors may face an increased risk of cancer as well as respiratory and heart disease.

Mental health issues will become more prevalent. Extreme weather can result in lasting mental illness. After severe flooding in England in 2013, for example, an estimated 37 percent of affected households suffered from anxiety, depression, or post-traumatic stress; public health and welfare costs are estimated to have

topped $32 million. These symptoms can persist for years. Droughts, floods, hunger, and poverty are triggering forced migration from Central America's Dry Corridor, for example, with migrants who are exposed to violence at home or in transit, suffering psychological impact. Some 56 percent of migrants screened in Mexico, for instance, had either moderate or serious symptoms of anxiety, depression, or post-traumatic stress.

Annual heat-related US deaths could increase 9X between now and 2100 in a high-emissions scenario

REDUCING CARBON FOOTPRINTS AND BUILDING RESILIENCE

The health sector both contributes to climate change and must address its consequences: essential and elective care demand swings, diminished site and staff capacity, and cost pressures that threaten long-term viability. Health and life sciences organizations face physical risks of climate hazards (such as disrupted operations and supply chains); transition risks from rapid policy, technology, or market changes (including cuts in healthcare spending); and liability risks (for example, for poor health outcomes).

Yet the health sector — like other sectors — has been slow to mitigate and adapt. It has historically perceived impacts to be distant, complex, or uncertain, and has deferred systemic change. Providers, payers, governments, and employers must ensure essential health services and products remain available, affordable, and accessible to all who need it; policymakers, meanwhile, must pursue low-carbon policies and strengthen health systems.

To reduce health risks and costs for the communities they serve, health and life sciences organizations must begin by reducing emissions and building resilience. There are solutions providers, payers, life sciences, employers, and policymakers can adopt to drive meaningful and lasting change.

Providers: Lead by example

Providers — hospitals, clinics, care facilities, and laboratories — have a large carbon footprint, with emissions coming from energy use in operations and supply chains. As climate change accelerates, providers face demand swings, diminished capacity, and financial stress. Specifically, providers will experience spikes and swells in the need for urgent and essential care due to acute and chronic climate hazards; disrupted or reduced capacity as climate hazards impair staff, supplies, and facilities; and lastly, delayed or forgone elective care, which poses an increasing health risk for patients and a financial strain for providers.

To cut emissions, providers must decarbonize facilities and supply chains where possible. For example, they must become energy-efficient, switch to renewable sources of energy and supplies, minimize waste, avoid unnecessary care, and use low-carbon technologies like telemedicine.

Providers can also alleviate the health impacts of climate change in their communities. One way is to ensure continuity of care both during crises and in the long run by investing in climate-resilient facilities and technologies, sourcing from green supply chains, and devising flexible staffing and service models. Another way is to enhance community resilience by supporting public health measures to improve well-being and equity. A third way is to lead on climate solutions: to inform, engage, persuade, and partner with patients, staff, and other health sector stakeholders to promote climate action and prepare for health impacts.

Payers: A more holistic approach

Payers — health insurers and governments — face asset and liability pressures, as well as reputational risks. Climate change makes investments more volatile, particularly those in high-carbon sectors or those with significant exposure to physical risks. Claims may become unpredictable and unmanageable as costs soar due to health crises. Public payers serving older, poorer, and more vulnerable populations will face severe cost pressure. Rising premiums will widen the already large health protection gap and increase reputational and regulatory risks for private insurers.

Here are four solutions for payers to help societies understand, reduce, and cope with climate-change health risk in a more holistic manner. First, curb emissions in operation and channel investments into green assets. Second, incentivize healthcare to go green — for example, by preferring sustainable providers, developing policies to reduce unnecessary care, reflecting climate risks in pricing, and/or encouraging risk reduction. Third, payers can reduce health impacts and inequities by developing products/models to ensure universal access to affordable prevention, diagnosis, and treatment, and by taking a holistic approach toward improving key health determinants, such as food and housing. Finally, payers must ensure operational and financial resilience by providing adequate and sustainable coverage to everyone who needs it. Working together, public and private payers can pool risks and limit losses more effectively and equitably.

Life sciences: Prepare for a changing disease burden

Pharmaceutical and life sciences companies, in particular, face pricing and patent challenges — pressures that add to the challenges and pushback from payers, providers, and patients who are all feeling the pinch as climate hazards increase the

cost of healthcare. Plus, pharma and life-sciences companies also face "physical" risks such as disrupted operations and supply chains and transition risks from policy and technology changes.

Employers: Protect your workforce

Employers face greater risks to workers' health and safety, thereby raising healthcare costs and lowering productivity, as climate change amplifies current health risks and introduces new ones.

Both indoor and outdoor workers may be exposed to heat, air pollution, or extreme weather at work. And, low-paid and migrant laborers can be especially vulnerable to these kinds of health risks.

Policymakers: Promote steps toward resilience

Policymakers face varied and complex threats to public health from climate hazards, including: deteriorating determinants of health, increasing healthcare needs and costs, growing inequalities in health, intensifying geopolitical tensions from climate migration, and the financial burden of being lenders and insurers of last resort.

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The health sector must strike a balance between efficiency and resilience

ALL STAKEHOLDERS MUST REDUCE THEIR CARBON FOOTPRINTS

The health sector must strike a balance between efficiency and resilience, cutting emissions and costs without sacrificing preparedness. All stakeholders have room to assess and reduce their climate-related vulnerabilities, and to encourage and incentivize others to go green. Some changes will increase efficiency and resilience: For example, clean energy and low-carbon technologies can reduce emissions, protect public health, and keep health services running through crises. Other options present trade-offs, such as just-in-case capacity and stockpiles of essential supplies that boost resilience but also costs, resources, or emissions.

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Pharma and life sciences companies:

Pharma and life sciences companies have opportunities to reduce their carbon footprint. First, curb emissions: reduce energy use, switch to renewable sources of energy and supplies, minimize waste, and invest in low-carbon technologies and techniques such as green chemistry. Second, make supply chains more resilient: reconfigure suppliers to account for emissions and vulnerabilities to climate and political or regulatory shocks. Third, prepare for a rapidly changing disease burden: align product pipelines (such as medications for tropical diseases or heat-related illness), and invest in rapid response capabilities and partnerships (for example, to repurpose drugs, devise tests, or discover vaccines for new infections). Lastly, reduce health impacts and inequities: prioritize affordable innovation and essential products including antibiotics and antivirals.

Employers:

Besides reducing their carbon footprint, there are four ways employers can reduce workers' vulnerability to climate impacts: first, monitoring climate-related risks to physical and mental health; second, mitigating risks through training and changes to work sites, schedules, practices, and equipment (such as climate-resilient buildings and personal protective equipment); third, ensuring there is guidance and support for affected workers; and fourth, improving socio-economic determinants of health (such as financial resilience). As payers, employers can design and select health benefits to promote sustainable healthcare delivery and increase workers' resilience to climate events.

Policymakers:

To minimize health impacts, policymakers should drive mitigation and adaptation efforts in the following ways: First, make "no-regret moves" such as low-carbon policies that promote clean air, water, housing, and transport, as well as healthy food and physical activity. Second, strengthen health systems by investing in resilient infrastructure, equipment, workforce, and supply chains; ensure sufficient supplies of essential products; and reward sustainability measures. Third, build national and community resilience by integrating direct and indirect health impacts into disaster planning and risk reduction. Fourth, ensure effective crisis response by monitoring climate trends and health impacts. Lastly, spur investment and innovation now to avert or respond to crises rapidly.

One of COVID-19's lessons has been the cost of inaction and the value of preparedness, prompt response, resilience, and coordination. Given the clear links from climate to health harms and the lag between emissions and consequences, urgent action is vital. The right responses today will go a long way toward reducing risks and the need to make even more drastic and expensive changes tomorrow.

AUTHORS

Kavitha Hariharan, Director, Healthy Societies, Marsh & McLennan Advantage

Rachel Zeldin, PhD, Principal, Health and Life Sciences, Oliver Wyman

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