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### Digital Reshaping the Health-Care Ecosystem

BI Medical Equipment & Devices, Global Dashboard



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#### 1. The Future Is Now: Health Care's Path to Digital Transformation

(Bloomberg Intelligence) -- Digital-health use accelerated during the Covid-19 pandemic and is now set to shape demand for tools that can add greater efficiency to the delivery of care as well as aid discovery of novel interventional approaches. Rising health-care costs and the shift to new payment models in this \$4 trillion market will increase the focus on care outside of traditional settings, which will rely heavily on connected technologies. Profound changes are underway in virtual care, treatment of chronic conditions and the expanded use of real-world evidence.

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We project telehealth will eclipse \$20 billion in revenue by 2027 and a \$12 billion opportunity in glucose monitors. Big tech isn't resting on its laurels as it seeks to capture \$25 billion in new revenue from emerging technologies by leveraging recent M&A in the sector. (02/23/22)

#### Key Topics

Tipping Point for Virtual Care Reached

Telehealth Set to Eclipse \$20 Billion, See 15% of Visits by 2027

Health-care delivery via telehealth will continue to accelerate after the industry's sea change in value with the pandemic. We believe the channel could reach \$20 billion in revenue and represent 15% of outpatient visits by 2027 as barriers to adoption fall and new offerings such as virtual primary care take root. Incumbents like Teladoc and large managed-care companies will drive the next leg of growth. (02/23/22)

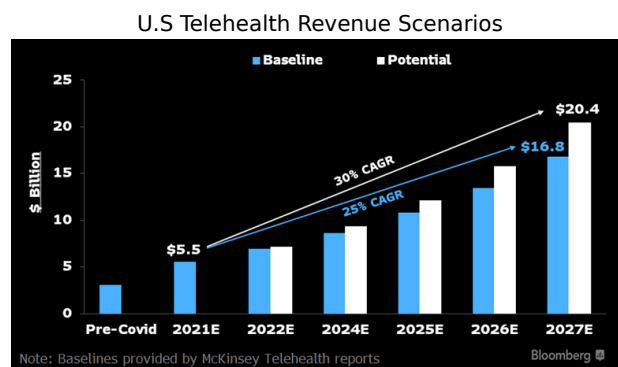
#### 2. Revenue Poised to Reach \$20 Billion by 2027

Contributing Analysts Noah Erni

Telehealth is set to become a staple of health-care delivery as our scenario analysis points to as much as \$20 billion in U.S. revenue by 2027. This assumes annual growth for the platforms of 30%, which we believe has been catalyzed by multiple waves of the pandemic and will further expand with a flood of virtual primary-care offerings from both major managed-care companies and technology upstarts. Our view on the overall market growth is informed by Teladoc's projections as the leading player, consensus across public equities and a premise that growth will accelerate as the fragmented market consolidates and investments by managed care rise dramatically.

At a minimum, we foresee the market expanding by 25% annually which essentially triples revenues to almost \$17 billion in 2027. (02/23/22)

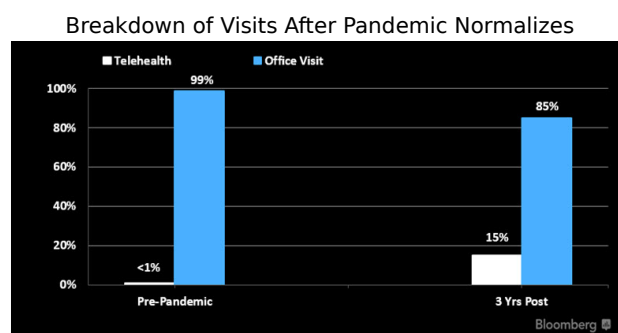
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### 3. 15% of Visits Could Be Virtual in 5 Years

Telehealth visits could reach 15% of total outpatient visits within 3-5 years, based on the seismic shifts in behavior and investments in technology due to the pandemic, in addition to the proliferation of virtual primary-care offerings coming to market. Studies showed telehealth reaching up to 50% of total visits in some regions of the U.S. during the worst of the pandemic, though these were likely due to necessity and were on dramatically reduced total visits. We don't view the 15% estimate as a peak, but rather a waypoint as digital increasingly becomes the front door to health care.

Our methodology is based on a bottom-up analysis. We established an upper bound by cross-referencing claim trends from multiple sources (pre-, during, post-pandemic) by category against the CDC's 2018 National Ambulatory Medical Care survey. (02/23/22)



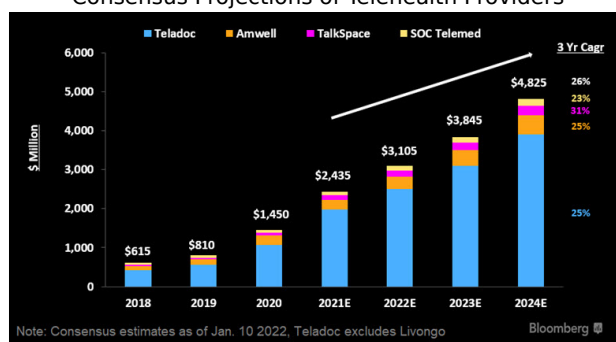
### 4. Revenue Projections Support Adoption Narrative

Revenue consensus for public telehealth companies supports our view on the massive change underway. The forward three-year compound annual growth of the group is more than 25% and sales in 2021 have tripled from a pre-pandemic base year of 2019. Teladoc represents the lion's share of revenue but even it is expected to deliver rapid growth off its larger base. The exhibit is illustrative: it doesn't account for the dearth of private companies, those acquired by larger managed-care companies (like MDLive at Cigna) and extension of telehealth across multiple consumer and patient platforms like those at GoodRx or OneMedical.

We expect increasing consolidation of related assets and businesses as the incumbents at scale increasingly view the virtual channel as a must-have offering within their portfolio. (02/23/22)

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Consensus Projections of Telehealth Providers



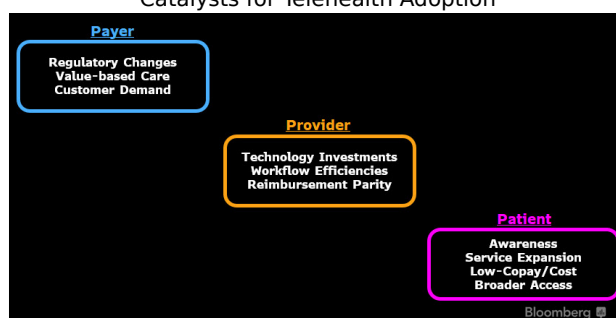
Source: Bloomberg Intelligence

### 5. Perfect Storm of Catalysts Spurring Next Wave of Growth

Catalysts to expand the adoption of telehealth abound across the key stakeholders. The pandemic accelerated the industry's rate of uptake by a factor of years and has created a flywheel effect for the overall virtual ecosystem. The changes in health-care delivery necessitated by shelter-in-place edicts raised awareness and showcased the capabilities of the virtual channel across both patients and physicians. This in turn resulted in increased technology investments by providers and health systems, which are increasingly leveraging the assets to provide care and reduce costs.

Payers have moved more significantly into the space as their customers demand digital solutions and the advent of virtual primary-care programs adds another facet in the drive to value-based care. (02/23/22)

Catalysts for Telehealth Adoption



Source: Bloomberg Intelligence

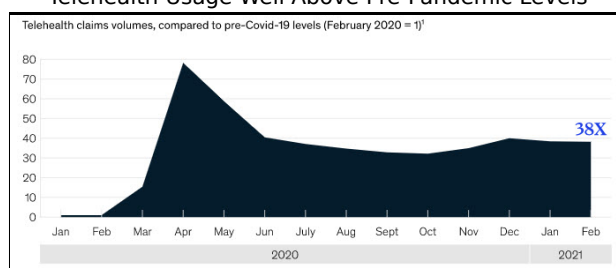
### 6. Pandemic Accelerated Shift to Virtual

Virtual care will increasingly become the norm, we believe, after the pandemic pushed patients away from in-person visits. A reversion to old practices and business models appears impossible to us after the pandemic forced meaningful change across all the key constituents. Claims data from Compile and McKinsey support this with figures showing that volume was 38x higher than pre-pandemic levels a year after its start and the trend has been durable after the peak shelter-in-place months of 2Q20.

While telehealth adoption had been slowly gaining traction, the pandemic removed many roadblocks to adoption. Chief among these were reimbursement, implementation costs, technology concerns (privacy, security) and patient-provider preferences. With these barriers removed due to necessity, usage will continue to grow. (02/23/22)

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Telehealth Usage Well Above Pre-Pandemic Levels



Source: Compile.com, McKinsey

### 7. New Programs Confirm Inflection

We believe 2021 marked the starting point of patients shifting to virtual care for more normalized doctor-patient interactions after the pandemic caused a radical acceleration in the adoption of telehealth. Virtual care for longitudinal care as opposed to episodic ailments will increasingly become the norm. A handful of the largest insurers and telehealth providers have created programs to capitalize on the trend. Three of these offerings stand out, all of which were launched in 2021.

CVS Health's Aetna group launched a nationwide solution in August. Notably, the service is powered by Teladoc, the leading telehealth provider, which kicked off its own offering, Primary360, in January. UnitedHealth, the largest insurer, is frequently at the fore of new services. Its entry signals that virtual is here to stay. (02/23/22)

Virtual Primary Care Launches

Company	Launch Date	Notes
UnitedHealthcare	18 Oct. 2021	Launches NavigateNOW a 'virtual-first' plan with \$0 copay for common medical and behavioral services in nine markets
aetna	10 Aug. 2021	Aetna Virtual Primary Care benefit, a nationwide offering leverages MinuteClinics and HealthHubs, powered by Teladoc
Cigna OSCAR	22 July 2021	Partnered to launch Oscar product in joint plans in Georgia and Tennessee
UnitedHealthcare	14 Jan. 2021	Introduced UnitedHealth Virtual Primary Care in 10 states plus Washington, D.C. with Amwell
TELADOC	1 Jan. 2021	Launched Primary360 with multiple partners
OSCAR	1 Jan. 2021	\$0 virtual primary care initially in 18 states, 47 markets
MDLIVE	13 Jan. 2020	MDLIVE partnered with Cigna's employer sponsored plans to offer wellness screenings
Humana	24 Apr. 2019	Launched On Hand plan with partner Doctor on Demand

Note: List not exhaustive

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Source: Bloomberg Intelligence

### Healthcare No Longer Bound to the Office

#### Technology Is Putting Easy Health-Care Access at Our Fingertips

A digital-first touchpoint in a patient's health-care journey is increasingly becoming the norm, a positive for well-known brands like CVS and Walgreens, which aspire to deliver care, as well as for insurers. The trend is aided by ubiquity of access via smartphones and broadband, growing online presences across the health-care services sector and the pandemic, which induced a further uptake of digital tools. (02/23/22)

### 8. Cellphones, Apps in Almost Every Pocket or Purse

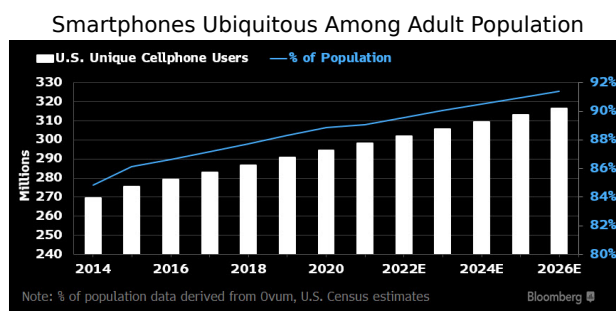
Digital-health interaction is increasingly just a click away as service providers and product manufacturers develop virtual front doors to their ecosystems. Outside of the clinical and economic benefits of virtual care, there are potentially societal gains as the technology can provide access to

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health care in rural communities and those with economic disparities, where receiving in-person care can be a challenge.

Ovum estimates there were close to 300 million unique cell phone users in 2021 -- almost 90% of the U.S. population. This likely encompasses just about the entire adult population capable of making their own medical decisions. Similarly, the latest Census study from 2018 estimates that 85% of U.S. households have access to a broadband internet connection. (02/23/22)

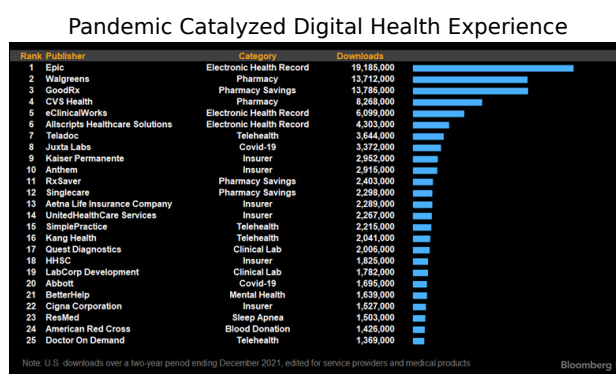


Source: Ovum TMT Intelligence, U.S. Census Bureau, Bloomberg Intelligence

### 9. Vaccinations Push Patients Into App Downloads

The pandemic has put more digital health-care tools in the hands of patients, which is likely to have a spillover effect on longer-term usage. Medical app downloads over the last two years are dominated by those who participated in the U.S.'s vaccination efforts, based on data from Sensor Tower. Downloading an app related to providers' and health systems' electronic medical records was a prerequisite for scheduling many second shots, hence the elevated totals for Epic, eClinicalWorks and Allscripts. Similarly, CVS and Walgreens helped to administer about 115 million vaccinations since authorization in late 2020. Not surprisingly, many of the nation's largest insurers round out the list.

GoodRx's position near the top exemplifies the strength of its marketing efforts to build a well-recognized digital brand. (02/23/22)



Source: Sensor Tower, Bloomberg Intelligence

### 10. Still Early Days for Many in Digital

The incumbents in the health-care services sector are increasingly interacting with patients through their digital assets, though the utilization is still in the early stages. We believe the maturation of platforms and users reaching a steady state is years away. Commentary out of 4Q earnings calls echoed past quarters where the companies continue to see a steady ramp-up in both users and transactions. Similarly, the narrative around investments in digital as an engine for growth remains strong.

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An online presence via a website and app with dedicated functionality and ease of use is now the table stakes across the industry. The pandemic helped to catalyze what was already a growing trend, the shift to digital-health delivery and the leveraging of physical assets with technology.

(02/23/22)

### Traditional Health-Care Services Views on Digital

<b>Anthem</b>	4Q21	"We also made meaningful headway in our digital transformation during the quarter... digital registrations rose 150% and business to Sydney Health grew 142%."
<b>Cigna</b>	4Q21	"We're continue to expand digital experiences that help our customers connect with the highest performing and most affordable medical care...Our ability to harness further leverage in the franchise off of shared services as well as our continued growth of our revenue portfolio. A digital first framework is mission critical within that."
<b>CVS</b>	4Q21	"Our digital capabilities for health interactions such as COVID testing and vaccines, prescription services and sales of health and wellness products have dramatically increased consumer engagement across all CVS Health businesses. We now serve 40 million customers digitally up approximately 10% in the last six months along in 2021 we launched several new digital health services powered by advanced analytics to personalize the experience."
<b>Humana</b>	4Q21	"We also plan to accelerate digital capabilities to increase our effectiveness and efficiency in member acquisition and focus on experience of our existing members to improve retention."
<b>Quest</b>	4Q21	"The MyQuest platform now has nearly 23 million users, up more than 3 million in the past quarter."
<b>Rite Aid</b>	F3Q22	"We are also continuing to make exciting progress on our digital initiatives with total digital revenue growing 73% versus last year....part of our plan to evolve the digital channel to meet our customers' ever-changing needs through enhanced convenience. Collectively, this has led to a 10% quarter-over-quarter increase in the number of known customers, who interacted with us digitally in the quarter."
<b>Walgreens</b>	F1Q22	"Digital sales were up 88% in the US driven by 3.6 million same day pickup orders. Walgreens saw the biggest Cyber Monday ever....We are in the early innings of possibilities for Walgreens' digital platform. We've enrolled over 92 million myWalgreens members, up 7.2 million since the fourth quarter."
<b>UnitedHealth</b>	4Q21	"We have unveiled our virtual care platform that brings behavioral care to the forefront, brings virtual care and physical care and connects people to their own trusted providers.... you'll see us continue to invest in technologies like our virtual care delivery platform, behavioral healthcare and home and communities."

Source: Bloomberg Intelligence

### Using Algos to Get the Full Diabetes Story

#### Sensor Technology Advances Expand the Market Beyond \$12 Billion

Contributing Analysts Matthew Henriksson (Health Care)

Abbott and Dexcom stand to benefit as continuous glucose monitors (CGMs) and their interoperability with insulin pumps become the standard of care in diabetes. Newer algorithms within smaller form factors create an initial market opportunity of \$12 billion, or 71% upside to 2021 levels, with an additional \$6-\$7 billion opportunity in China and India further out. Beyond glucose, this technology can be used to detect other analytes. (02/23/22)

### 11. Initial CGM Opportunity Worth Up to \$12 Billion

Contributing Analysts Matthew Henriksson (Health Care)

The CGM market could be worth more than \$12 billion in its initial phase as the technology becomes the standard of care, representing 71% upside from its current size. This initial opportunity is based on 4 million patients in the U.S. and 6 million in markets including Canada, Germany, the U.K, and Japan that have large populations with type 1 or 2 diabetes and need intensive insulin use, with an additional 3 million in the U.S. who use insulin daily but not intensively.

This initial opportunity doesn't include two big segments. The first is China and India, where we estimate that 21.5 million patients suffer from diabetes and require insulin, while the second opportunity is the type-2 population that doesn't require insulin at their current stage of the disease, with nearly 30 million Americans falling into this category. (02/23/22)

#### Initial CGM Market Opportunity

	US Opportunity	Core OUS Opportunity	Total
<b># of Patients</b>	7,000,000	6,000,000	13,000,000
<b>Sensor Penetration</b>	75%	50%	63%
<b>Sensor Patients</b>	5,250,000	3,000,000	8,250,000
<b>Price per Day (\$ Actual)</b>	\$4	\$4	\$4
<b>Wear Length (Days)</b>	14	14	14
<b>Sensors/Yr per Patient</b>	26	26	26
<b>Revenue per Patient (\$ Actual)</b>	1,456	1,456	1,456
<b>Total Market Value (\$ Mln)</b>	\$7,644	\$4,368	\$12,012

Note: US Opportunity includes all patients using insulin

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Source: Bloomberg Intelligence

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### 12. China and India Could Add \$7 Billion

Contributing Analysts Matthew Henriksson (Health Care)

The CGM opportunity in China and India realistically could be \$6-\$7 billion markets, according to our scenario analysis, on top of the \$12 billion initial opportunity. Our analysis is based on approximately 21.5 million patients that are on insulin therapy in those two countries. Assuming a 50-75% penetration rate, similar to current expectations for developed countries, and a price per day of \$1-\$2, a cut from current levels that we expect is needed to enter these markets, we arrive at the \$6-\$7 billion level. If the market dynamics replicate the U.S., with 75% penetration and \$4 per day, the total could increase to \$22.6 billion.

This opportunity will likely not begin to materialize until 2023, given Dexcom is 2-3 years away from entering China. Still the long-term reward is worth the wait. (02/23/22)

China and India Scenario Analysis (in \$Mln)

		Market Penetration Rate			
		10%	25%	50%	75%
Price	\$1	\$753	\$1,881	\$3,763	\$5,644
Per	\$2	\$1,505	\$3,763	\$7,525	\$11,288
CGM	\$3	\$2,258	\$5,644	\$11,288	\$16,931
Per	\$4	\$3,010	\$7,525	\$15,050	\$22,575
Day					

Note: Assumes 21.5 million patients in China and India require insulin Bloomberg

Source: Bloomberg Intelligence

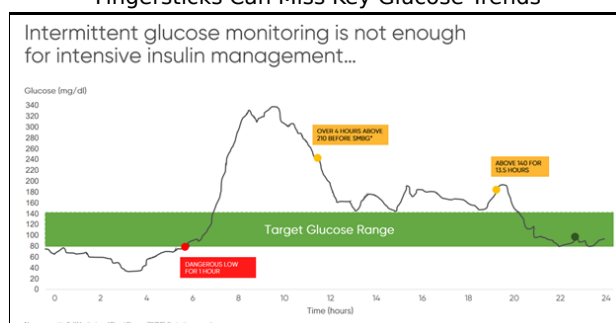
### 13. New Algorithms Make CGMS Standard of Care

Contributing Analysts Matthew Henriksson (Health Care)

CGMs will be the standard of care as the benefits are realized by diabetic patients. Currently, the devices can measure glucose levels every five minutes, or 288 readings per day, vs. 4-5 readings with finger sticks. Their algorithms, which are becoming more accurate, can also detect trends in glucose levels to provide a more comprehensive view of the patient's status and keep them more within target ranges than finger sticks, which can miss key trends throughout the day.

The next generation of sensors, including Dexcom's G7 and Abbott's Libre 3, are expected to be 30% smaller than their predecessors and will cost less to manufacture, easing access for consumers. (02/23/22)

Fingersticks Can Miss Key Glucose Trends



### 14. With Interoperability, Insulin Is Automatic

Contributing Analysts Matthew Henriksson (Health Care)

The approval of interoperable insulin pumps and algorithms should boost demand for Dexcom's CGMs as pump users add the units to their treatment paradigms. These automated delivery systems allow pumps to receive CGM readings and calculate how much insulin to administer, eliminating human error. The FDA has new diabetes approval guidelines that shorten approval

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times by allowing for insulin pumps, continuous glucose monitors and algorithms to be deemed "interoperable," meaning insulin pumps will no longer require a clinical study to be compatible with other CGMs.

Abbott potentially has much to gain from these guidelines, in our view, given it is in talks to connect its sensors with pumps from Tandem Diabetes and Insulet, which is expected to launch its Omnipod 5 in 2022. (02/23/22)

Automated Insulin Delivery Landscape

Trial	Medtronic		Insulet		Tandem	
	US Adolescents	US Adults	US Total	Pediatric	Adolescents and Adults	Total
Device	780G	780G	780G	Omnipod 5	Omnipod 5	Control-IQ
# of Patients	39	118	157	112	128	168
Mean Age - Study Arm	16.2	45.6	38.3	10.0	37.0	0.0
Baseline HbA1c	7.6%	7.5%	7.5%	7.7%	7.2%	7.4%
Ending HbA1c	7.1%	7.0%	7.0%	7.0%	6.8%	7.1%
Baseline Time-In-Range	62.4%	70.9%	68.8%	52.5%	64.7%	59.0%
End Time-In-Range	72.7%	75.1%	74.5%	68.0%	73.9%	71.0%
Change Time-In-Range	10.3%	4.2%	5.7%	15.5%	9.2%	12.0%
Baseline Time < 70 mg/dL	3.3%	3.4%	3.3%	1.4%	2.0%	1.9%
End Time < 70 mg/dL	2.4%	2.3%	2.3%	1.5%	1.1%	1.4%
Change in Hypoglycemia	-0.9%	-1.1%	-1.0%	0.1%	-0.9%	-0.5%
Time in Closed Loop	93.8%	95.2%	94.9%	N/A	N/A	92.0%
CGM Paired	Guardian 3	Guardian 3	Guardian 3	Dexcom G6	Dexcom G6	Dexcom G6
# of Calibrations	3-4	3-4	3-4	0	0	0

Note: Hypoglycemia defined as < 70 milligrams per deciliter (mg/dL)

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Source: Bloomberg Intelligence

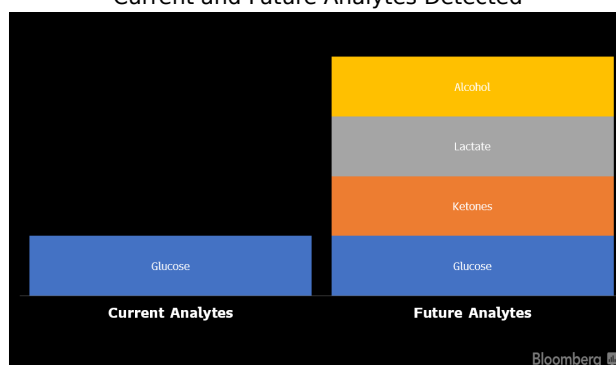
### 15. Wait -- There's More Than Glucose

Contributing Analysts Matthew Henriksson (Health Care)

The sensing technology in CGMs can be used to detect other substances -- known as analytes -- beyond glucose, expanding the overall market opportunity further. The developments are in the early stages, so the target market size is not fully defined, yet it indicates further opportunities for these technologies once the CGM market becomes saturated.

Abbott is leading the way with its Lingo project, initially with two key analytes. A ketone biowearable is being developed to track ketones continuously to detect ketosis and provide insights on dieting and weight loss. Additionally, a lactate biowearable is in development to track continuous lactate build-up during exercise, which can be used as an indicator of athletic performance. (02/23/22)

Current and Future Analytes Detected



Source: Bloomberg Intelligence

### New Cardio Technology Outpaces Stethoscopes

#### New Cardio Tech Offers Several Multibillion-Dollar Opportunities

Contributing Analysts Matthew Henriksson (Health Care)

Implantable sensors that offer early detection of cardiac conditions could grow into billion dollar markets by 2025. Atrial fibrillation (AF), led by Medtronic and Boston Scientific, may reach \$1.25 billion (12% compound annual growth), we believe, and heart failure (HF), dominated by Abbott,



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could be \$1 billion. Detection is a priority as these conditions create a \$90 billion annual burden. Ambulatory technology, led by IRhythm, is also a \$1 billion opportunity. (02/23/22)

### 16. It's Like a Stethoscope Directly on Your Heart

Contributing Analysts Matthew Henriksson (Health Care)

Implantable cardiac monitors (ICMs) could reach \$1.25 billion by 2025 as Boston Scientific and Medtronic lead the way to diagnose AF before it causes stroke. Permanent implantables, including Boston Scientific's Lux-DX and Medtronic's LINQ II, monitor a patient's subcutaneous electrocardiogram (ECG) data when specific arrhythmias are detected, which physicians can review remotely. There is no predecessor for detecting AF; doctors relied on symptoms, including stroke.

At least 10 million Americans who would qualify for an ICM, based on women over 75 who automatically have a CHA2DS2-VASc stroke-risk score of 3, the key inclusion criterion in the Linq clinical trials. The sum rises when adding patients with conditions like hypertension and diabetes. A 5% penetration and \$2,500 average selling price (ASP) gets to \$1.25 billion. (02/23/22)

CHA2DS2-VASc Risk Factors

	Condition	Points	# of Patients (Min)
<b>C</b>	Congestive heart failure	1	6
<b>H</b>	Hypertension: blood pressure consistently above 140/90 mmHg	1	37
<b>A2</b>	Age ≥75 years	2	21
<b>D</b>	Diabetes Mellitus	1	35
<b>S2</b>	Prior Stroke or TIA or thromboembolism	2	8
<b>V</b>	Vascular disease (e.g. peripheral artery disease, myocardial infarction)	1	13
<b>A</b>	Age 65–74 years	1	32
<b>Sc</b>	Sex category (i.e. female)	1	150

Note: # of patients in the U.S.

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Source: Bloomberg Intelligence

### 17. ICM for Heart Failure Can Add \$1.1 Billion Sales

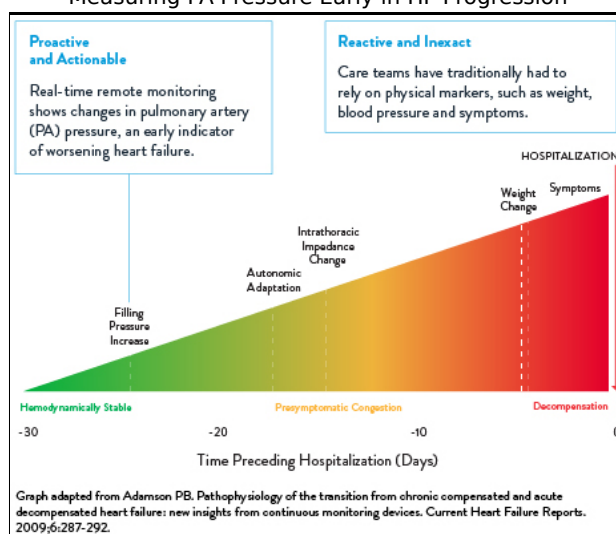
Contributing Analysts Matthew Henriksson (Health Care)

ICM technology is also being implemented to prevent heart failure (HF) hospitalization, and Abbott could add 0.2 percentage point to 2022 growth with a expanded label for CardioMEMs. It currently has a first-mover advantage with an expanded FDA premarket approval (PMA) for CardioMEMs, which can remotely manage pulmonary artery pressure, a proactive indicator for HF. The approval adds 1.2 million patients as candidates for implantable HF screening. Every 1% penetration of the 6.2 million HF patients in the U.S. represents \$1.1 billion in sales.

Abbott should benefit from its first-mover advantage until at least 2024, as Medtronic and Boston are working to expand their Linq and Lux-DX devices for HF. (02/23/22)

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### Measuring PA Pressure Early in HF Progression



Source: Company Filings, Bloomberg Intelligence

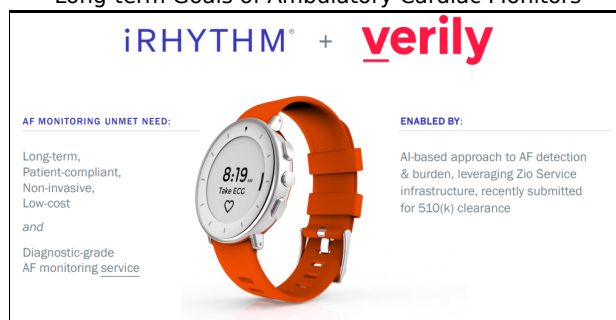
### 18. Ambulatory Cardiac Monitoring Best of Both Worlds

Contributing Analysts Matthew Henriksson (Health Care)

While ICMs are an important component to detect AF early in its progression, ambulatory monitoring systems can provide similar early discovery without implants, creating a market with a 20%-plus compound annual growth rate. There are roughly 6 million diagnostic tests annually in the U.S., but a majority are done with antiquated Holter monitors. Transitioning entirely to ambulatory technology, which we believe is likely, creates a \$2 billion long-run opportunity, based on an ASP of \$300, up from \$1.2 billion in 2021.

IRhythm is a pioneer with its Zio two-week biosensing technology that uses cloud-based data analytics while partnering with Verily to develop a smart watch that provides diagnostic grade monitoring. Philips' Biotelemetry and Boston Scientific's Preventice franchises are also developing ambulatory technology. (02/23/22)

### Long-term Goals of Ambulatory Cardiac Monitors



Source: Company Filings, Bloomberg Intelligence

### Pharma Embracing Digital for Research, Care

#### Digital Enables Focus on Care Management, Research Development

Digitization of health care provides an opportunity for traditional pharmaceutical companies to expand existing treatment platforms to test new modalities that complement their business model. These tools can provide valuable real-world evidence into possible effects on treatment and test the safety and efficacy of new therapies. (10/12/21)

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### 19. Digital Tools for Care Management

Companies traditionally focused on therapy delivery can add value to existing product offerings by integrating digital tools for disease management. About 133 million people in the U.S. have at least one chronic disease (including diabetes and COPD), and that number is expected to rise to 171 million, or 49.2% of the population, by 2030. While delivery will remain a key focus for manufacturers in those therapeutic areas, digital companions that enable chronic-disease management could be integrated into business models and may appeal to a diverse set of payers and providers focused on lowering costs.

Roche's tie-up with mySugr app for diabetes management, and new partnership to track multiple sclerosis symptoms are just two examples of value-added approaches to traditional forms of therapy. (10/12/21)

Pharma -- Digital Health Partnerships

Pharma Company	Digital Company	Indication	Scope
Roche	Temedica	Multiple Sclerosis	Track day-to-day MS symptoms
Boehringer Ingelheim	Click Therapeutics	Schizophrenia	Joint development of digital treatment for patients with schizophrenia
Otsuka Pharmaceuticals	Click Therapeutics	Major Depressive Disorder	Measure DTx effectiveness in reducing symptoms of depression for adults with MDD
Novartis	Titak Healthcare	Remote Vision Monitoring	Smartphone app to monitor and engage patients with chronic eye diseases

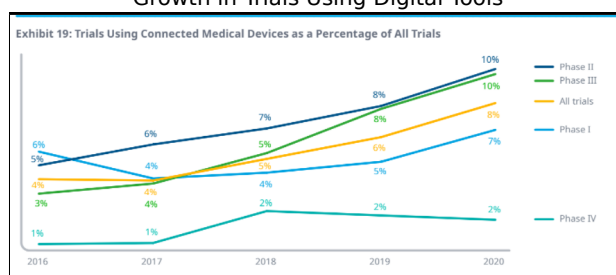
Source: Bloomberg Intelligence

### 20. Decentralizing Clinical Trials Using Digital Tools

Digital-health technologies are increasingly being incorporated into the clinical-trial process to improve collection of objective data. Wearables and other connected devices are increasingly being used to gather passive, real-world physiological data to reduce reliance on subjective patient-reported details routinely captured in diaries. By decentralizing the clinical-trial process through connected devices, patient burden is reduced through fewer visits, which can increase patient retention (an estimated 30% dropout per trial), increase the diversity of the trial pool and lower costs.

LabCorp, Science 37 and Medidata are among the handful of IT companies utilizing digital technologies to capture endpoints relating to gait assessment, oximetry, sleep patterns, blood pressure and physical activity, among others. (10/12/21)

Growth in Trials Using Digital Tools



Source: IQVIA

### 21. Digital Tools Could Reduce Drug-Trial Diversity Gap

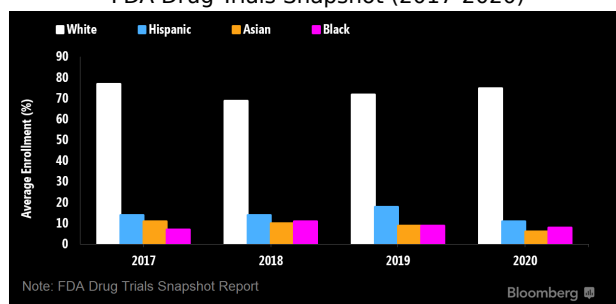
Concerns about the lack of diversity could drive demand for decentralizing aspects of clinical trials to incorporate underrepresented minorities. The FDA's 2020 drug-trials snapshot highlights the participation of Black and Hispanic people in trials supporting new-drug entities (8% and 11%, respectively, vs. 13% and 17% of the overall population), which declines to 5% and 5.5% for oncology trials. Common barriers cited by participants include lack of trial awareness, convenience of site location and transportation, among others.

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Improved outreach to underrepresented communities to raise awareness of clinical trials, along with digital tools that can make certain aspects of the studies more national in scope, have the potential to reduce patient barriers and improve research diversity. (10/12/21)

FDA Drug Trials Snapshot (2017-2020)



Source: Food and Drug Administration

### Changing Payments, Physicians Spur Adoption

#### Health-Care Delivery Changes Will Accelerate Digital Adoption

Wider adoption of value-based payment strategies and changing physician attitudes could spur adoption of digital-health technology. Shifting demographics, coupled with regulatory flexibility, will lead to greater demand for tools that enable aging in place and hospital-level care in the home.

(10/06/21)

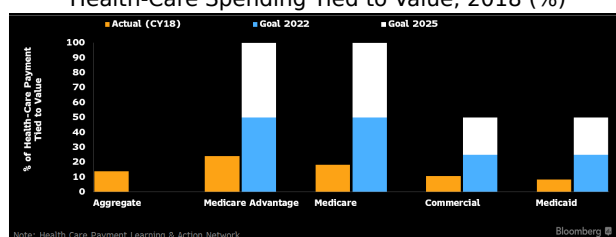
## 22. Bending Cost Curve Through Value-Based Models

Escalating health-care costs and Medicare's continuing financial instability could be a major catalyst for payers and providers to adopt technologies that can help transition the health-care economy to a value-based outcomes-focused system from fee-for-service. Projected health and Medicare spending is expected to remain constant in the mid-single digits over the next 10 years. New payment methods will likely be implemented to shift risk onto providers to mitigate health-care spending trends.

This push could be a catalyst for providers to incorporate digital-health solutions into clinical practice to increase patient engagement, enable continuous patient monitoring and delivery of care in lower-cost settings -- such as the home -- without jeopardizing patient safety and privacy.

(10/06/21)

Health-Care Spending Tied to Value, 2018 (%)



Source: Health Care Payment & Learning Action Network

## 23. Hospital-at-Home Trend Could Drive Digital Adoption

Innovative care models that promote hospital-level care in the home are a pre-pandemic trend likely to accelerate and require adoption of virtual care and hospital-grade remote monitoring technologies. The hospital-at-home trend will continue a focus on the home as a substitute for acute hospital care targeting chronic conditions such as congestive heart failure, COPD and

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asthma. Evidence thus far suggests hospitals can achieve equal or better outcomes and cost savings through shorter inpatient stays without sacrificing patient safety.

Medicare launched a hospital-at-home program in 2020 providing fee-for-service reimbursement of home-based hospital services. Given robust provider participation, the model is likely to continue after the pandemic, providing a runway for continued demand for digital-health technology.

(10/06/21)

Common Diagnosis for Medicare Inpatient Stays

Principal Diagnosis	Total Number of Stays	Aggregate Hospital Costs
Heart Failure	833,000	9400
Osteoarthritis	648,000	11300
Pneumonia	466,000	3900
Cardiac dysrhythmias	422,000	4800
COPD	303,000	5000
Acute myocardial infarction	377,000	8000

\*Aggregate Hospital Costs in Millions  
Note: AHRQ, Healthcare Cost and Utilization Project

Source: AHRQ

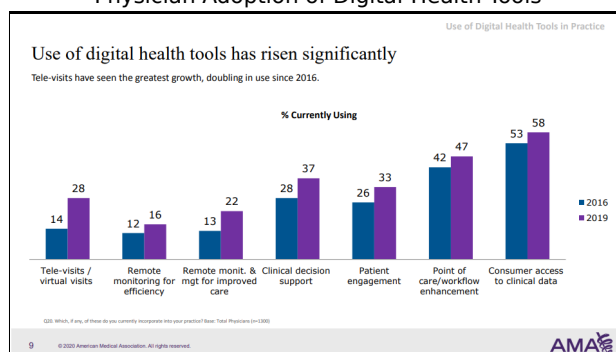
### 24. Payment Changes for Digital Tech Could Spur Adoption

Medicare's proposed adoption of new payment codes for the collection of data from digital tools could be another adoption catalyst. Medicare has proposed new therapeutic monitoring codes to collect non-physiological medical-device data that support medical adherence, medication response and other information that can be used to influence clinical decision-making. The new codes could fill gaps in the coverage of remote patient monitoring, now limited to physiological data captured from a connected device, as well as include billing by medical professionals that can't bill for remote monitoring, such as physical therapists.

Medicare's adoption of therapeutic codes coincides with shifting physician attitudes toward increased willingness to incorporate virtual and other digital-health tools into their practices.

(10/06/21)

Physician Adoption of Digital-Health Tools



### 25. Technology-Competent Seniors to Spur Adoption of Digital Tools

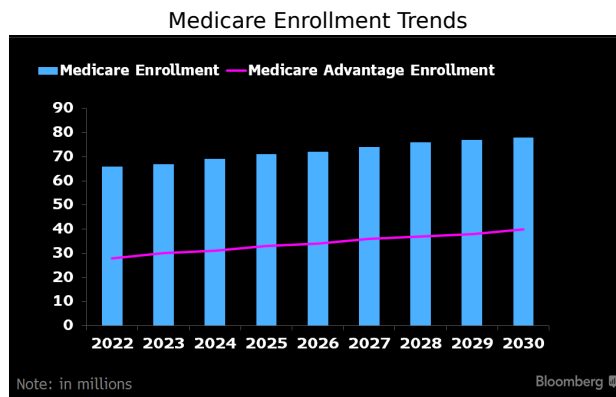
Medicare beneficiaries of the future, expected to have higher rates of obesity and diabetes, could demand greater integration of digital tools into their health management to enable them to age at home, creating an opportunity for managed-care private plans to increase technological capabilities. Medicare's population is projected to rise to 77 million by 2029, with private-plan enrollment of 40 million. These seniors are likely to be more digitally competent, and have familiarity with smartphones, apps and other connected technologies.

Medicare Advantage plans, with monthly capitation payments and bonuses for meeting quality thresholds that include patient satisfaction and outcome metrics, will have an incentive to adopt

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digital tools that appeal to seniors and help manage chronic diseases. (10/06/21)



Source: Congressional Budget Office

### Big-Tech Healthcare Ambitions in Cloud, Data

Apple, Microsoft, Salesforce Focus on Data, Cloud in Health Care

Contributing Analysts Anurag Rana (Technology)

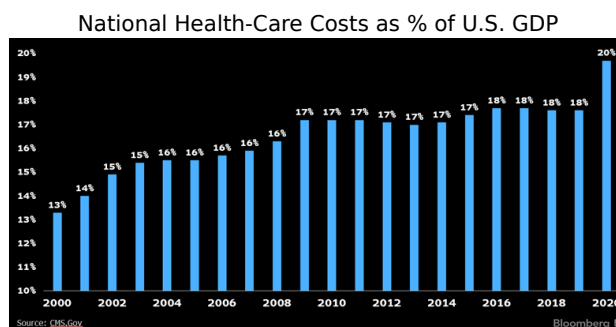
The pandemic and rising costs are crucial factors that could push the health-care industry into greater digitization. This will likely shift more funding toward the biggest technology providers that can outspend smaller rivals in security and data compliance. Our analysis suggests this could add over \$25 billion in additional revenue for the group over the next five years. (02/23/22)

### 26. \$4 Trillion Health-Care Sector Trails in IT Adoption

Contributing Analysts Anurag Rana (Technology)

The \$4 trillion-plus health-care industry provides ample growth opportunities for any tech company, as it significantly lags behind other sectors such as financial services, retail or communications in embracing emerging technologies. Rising costs, value-based health care, more consumerization and the pandemic are key catalysts creating demand for additional digital solutions in the industry. Cloud, telemedicine, connected devices and data analytics are some of the key focus areas for tech companies as they aim to modernize this industry.

Given that patient privacy, security and compliance are critical to the health-care sector, larger technology companies or startups that utilize their infrastructure from one of the hyper-scale cloud providers such as Amazon.com, Microsoft or Google have an edge. (02/23/22)



Source: Bloomberg Intelligence, CMA

### 27. Could Add Over \$25 Billion in Additional Sales

Contributing Analysts Anurag Rana (Technology)

Increased spending on emerging technologies could add at least \$25 billion in revenue for the top tech companies over the next five years, even if only 5% goes to these providers, according to our

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scenario analysis. We're assuming that tech spending in the health-care sector is at about 6-7% of the total, or around \$246-\$287 billion, and could grow at a rate of 5% a year through 2027.

Cloud, security and other emerging technologies may have accounted for about 25% of total spending in 2020 and will reach just 32% by 2027, according to our calculations. We designate cloud, data analytics, security, connected devices, augmented- and virtual-reality as the main emerging technologies. (02/23/22)

Health-Care IT Spending Forecast

Assumptions									
2020 Total Health-Care Spending: \$4,100 Billion									
2020 Health-Care IT Spending (% of Total Health-Care): 6%-7%									
2020 Total Health-Care IT Spending: \$246-\$287 Billion									
2023-2027 Large-Tech Health-Care IT Spending: \$25.7 Billion									
	2020	2021	2022	2023	2024	2025	2026	2027	
Health-Care IT Spending (\$B)	\$267	\$280	\$294	\$309	\$324	\$340	\$357	\$375	
% YoY Change	5%	5%	5%	5%	5%	5%	5%	5%	
Emerging Technologies (%)	25%	26%	27%	28%	29%	30%	31%	32%	
Emerging Technologies (\$B)	\$67	\$73	\$79	\$86	\$94	\$102	\$111	\$120	
Contribution to Large-Tech (%)	5%	5%	5%	5%	5%	5%	5%	5%	
Contribution to Large-Tech (\$B)	\$3.3	\$3.6	\$4.0	\$4.3	\$4.7	\$5.1	\$5.5	\$6.0	

Note: Data shown in Fiscal Years.

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Source: Bloomberg Intelligence

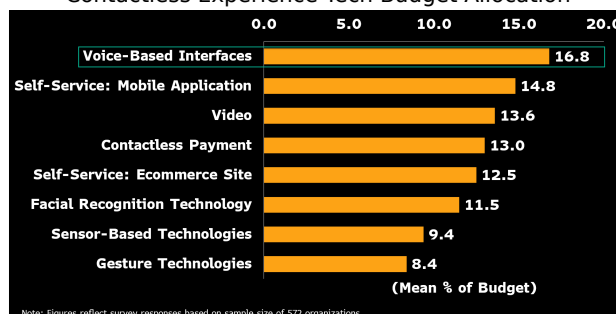
### 28. Nuance Could Give Microsoft an Edge Against Rivals

Contributing Analysts Anurag Rana (Technology)

The pending Nuance acquisition could give Microsoft an edge vs. other software providers also trying to sell cloud-based platforms in the health-care industry. Nuance's voice-based software transcribes patient consultations and integrates well with Microsoft's products. Microsoft cloud focuses on several key areas such as virtual health, care team collaboration, remote patient monitoring and managing health data.

Microsoft cloud covers all the leading technologies such as cloud-enabled applications, machine learning and telemedicine. Increased adoption of its health cloud product would help both its infrastructure product Azure and productivity applications. (02/23/22)

Contactless Experience Tech Budget Allocation



Note: Figures reflect survey responses based on sample size of 572 organizations.

Source: IDC, Bloomberg Intelligence

### 29. Apple's Strategy Revolves Around iWatch, Apps

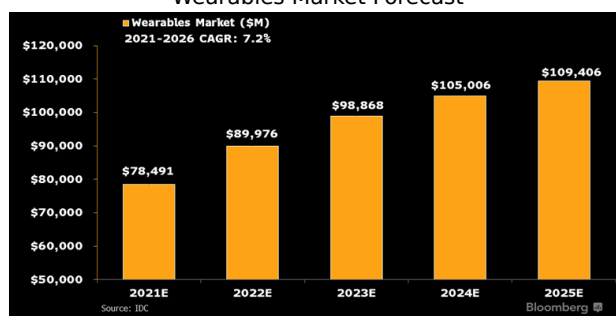
Contributing Analysts Anurag Rana (Technology)

Apple's sector strategy is centered around preventive medicine with its iWatch and App store. The iWatch has added new functionalities and sensors over the years such as a heart-rate monitor, ECG app and fall detection, and may add body temperature and blood-sugar sensors in future versions. A reduction in the cost of sensors and data storage has been a key catalyst for increased popularity of wearables, coupled with higher fitness awareness and population health management. Apple's strong focus on privacy will likely be an advantage if it ever expands to a Microsoft-like health-care cloud product and away from wearables. (02/23/22)



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Wearables Market Forecast



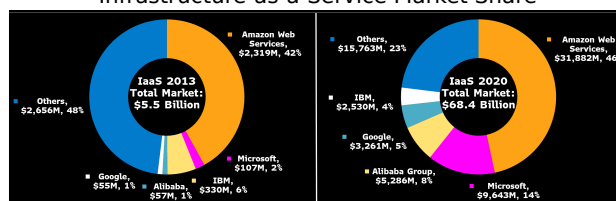
Source: Bloomberg Intelligence, IDC

### 30. Amazon Health-Care Ambitions May Aid Microsoft, Google

Contributing Analysts Anurag Rana (Technology)

Amazon.com's ambitions to expand into the health-care industry, especially drug delivery, could make sector participants wary about working with its cloud division, Amazon Web Services (AWS), and extend more work to either Microsoft or Google. This trend is already visible in retail, where clients prefer to work with a non-Amazon technology provider. AWS leads the cloud infrastructure-as-a-service market with about 46% of market share, followed by Microsoft and Google, which are the other two hyperscale cloud providers in the U.S., based on IDC data. (02/23/22)

Infrastructure-as-a-Service Market Share



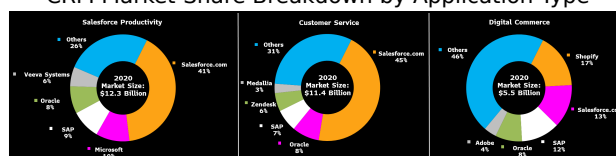
Source: IDC, Bloomberg Intelligence

### 31. Salesforce Strong Cloud Portfolio May Test Microsoft

Contributing Analysts Anurag Rana (Technology)

As the pace of digital transformation picks up in health care, we expect Salesforce.com to win its fair share of cloud deals. It also has a health-care cloud product that focuses on aspects such as remote patient monitoring and patient engagement. Salesforce is 5x larger than its nearest rival in customer-service cloud applications, which makes it a good candidate for new patient engagement products, as the industry becomes more digital. Its recent acquisition of Slack could also be a differentiator down the road, given it's one of the largest chat-based collaboration software products. (02/23/22)

CRM Market-Share Breakdown by Application Type



Source: IDC, Bloomberg Intelligence

### 32. Cerner Could Strengthen Oracle's Market Position

Contributing Analysts Anurag Rana (Technology)

The \$28 billion pending acquisition of Cerner could significantly expand Oracle's expertise in health care and give it a shot to participate in the modernization of this industry. Like Microsoft and Salesforce, it also has a plethora of application and infrastructure cloud software products, but it

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trails both companies in almost all categories where they overlap. Cerner would also give it a large install base of health-care clients that could gravitate toward Oracle as they upgrade, instead of cloud-infrastructure leaders Amazon, Microsoft or Google. (02/23/22)

### Oracle - Cerner M&A



Source: Bloomberg Intelligence

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