By Keisuke Nakagawa, Joseph Kvedar, and Peter Yellowlees

DOI: 10.1377/hlthaff.2018.05098
HEALTH AFFAIRS 37,
NO. 12 (2018): 2069–2075

ANALYSIS

Retail Outlets Using Telehealth Pose Significant Policy Questions For Health Care

ABSTRACT Telehealth will enable new models of care to emerge as health care continues to undergo significant changes. Health insurers, providers, and pharmacy benefit managers are merging, which will consolidate market share among fewer large companies. Recently, retail giants such as Walmart and Amazon have announced plans to compete in the health care industry. As these organizations seek to provide convenient and affordable access to care, telehealth will play a significant role in the competition for market share and will create new opportunities for innovation. Additionally, the increasing adoption of telehealth by retail outlets and vertically integrated health care organizations raises new policy questions in such areas as information access, privacy and security, the combination of health and consumer data, and ways to foster provider independence amid increasing consolidation.

Keisuke Nakagawa (drknakagawa@ucdavis.edu) is a postdoctoral scholar in the Department of Psychiatry and Behavioral Sciences, University of California Davis, in Sacramento.

Joseph Kvedar is vice president for connected health, Partners Healthcare, and a professor of dermatology, Harvard Medical School, both in Boston, Massachusetts.

Peter Yellowlees is a professor of psychiatry, Department of Psychiatry and Behavioral Sciences, University of California Davis, in Sacramento.

The health care sector has been undergoing a significant transformation over the past few decades. Patients can now access health care services from almost anywhere at any time using telehealth and mobile networks. Health care organizations are consolidating throughout the supply chain, with mergers of payers, providers, and pharmacies becoming increasingly commonplace. Major retailers such as Walmart and Amazon are aggressively moving into the health care business through partnerships and acquisitions.[1–3] Telehealth is likely to enable these organizations to deliver new models of care for consumers. Current policies are insufficient to address the opportunities and threats created by these new developments.

Consolidation In The Health Care Sector

The health care industry has been undergoing consolidation for decades.[4,5] Initially, health care organizations merged with competing organizations to increase their market share, a process termed horizontal integration. For example, UnitedHealth has spent more than $22 billion since 1994 acquiring numerous health insurers (exhibit 1). Over the years many insurers, hospitals, and physician groups have merged with competitors to increase market share through horizontal integration. This has resulted in a smaller number of national health care companies. But in recent years there have been significantly fewer horizontal integration deals between health care insurers. Two separate mergers were canceled in early 2017 following opposition from the Department of Justice over antitrust issues: the $48 billion Anthem-Cigna merger and the $34 billion Aetna-Humana merger.[6,7] Although horizontal integration activity has decreased, vertical integration has continued.

Vertical integration occurs when companies acquire or merge with organizations upstream or downstream in their supply chains, creating operational efficiencies and more control over costs. For example, CVS, one of the largest retail pharmacy chains, acquired one of the largest pharmacy benefit managers, Caremark, for

EXHIBIT 1

Selected acquisitions by UnitedHealth, by year

Acquired company	Type of acquisition	Cost (millions)	Year
Ramsay-HMO	Horizontal	$502	1994
GenCare Health Systems, Inc.	Horizontal	$520	1994
MetraHealth Cos.	Horizontal	$1,700	1995
AmeriChoice	Horizontal	$517	2002
Mid Atlantic Medical Services	Horizontal	$3,000	2003
Oxford Health Plans	Horizontal	$4,900	2004
Definity Health	Horizontal	$300	2004
PacifiCare Health Systems	Horizontal	$8,100	2005
Sierra Health Services	Horizontal	$2,600	2007
Humedica	Vertical; technology	—[a]	2013
Alere Health	Vertical; technology	$600	2014
Catamaran Corporation	Vertical; pharmacy benefit manager	$12,800	2015
MedExpress Urgent Care	Vertical; provider	$1,500	2015
Rocky Mountain Health Plan	Horizontal	$36	2016
Surgical Care Affiliates	Vertical; provider	$2,300	2017
DaVita Medical Group	Vertical; provider	$4,900	2017
Reliant Medical Group	Vertical; provider	$28	2018
Sound Inpatient Physician Holdings	Vertical; provider	$2,200	2018

SOURCE Authors' analysis of data from Becker's Hospital Review, Crunchbase, the *New York Times*, the *Wall Street Journal*, and United Press International (detailed sources available from the authors on request). **NOTES** The exhibit does not show a complete list of acquisitions. All horizontal acquisitions were acquisitions of a company in the health insurance business. Vertical acquisitions were acquisitions of a company in the health care industry supply chain that was not a health care insurer. [a]Detailed information not located in publicly available sources.

$21 billion in November 2006.[8] UnitedHealth has acquired organizations throughout the supply chain, including ambulatory surgical centers (for example, Surgical Care Affiliates), medical groups (DaVita Medical Group and Reliant Medical Group), urgent care facilities (MedExpress Urgent Care), pharmacy benefit managers (Catamaran Corporation), and technology vendors (Alere Health and Humedica) (exhibit 1). All five of the largest for-profit health insurers (UnitedHealth, Anthem, Aetna, Cigna, and Humana) have engaged in vertical integration efforts through proposed or completed mergers and acquisitions.[9–13]

Unfortunately, the benefit of these horizontal and vertical integration efforts for consumers is unclear. Studies have shown that horizontal mergers have historically driven up prices for consumers,[14–18] and there is little evidence to demonstrate that cost savings from vertical integration will be passed along to consumers.

Telehealth's Role In Consolidation: Access, Convenience, More Data

While horizontal and vertical integration consolidate market share among fewer large companies, consumers are finding more ways to access care outside of traditional health care office settings. Visits to urgent care clinics and telehealth video consultations have increased substantially year over year.[19,20] Kaiser Permanente, a managed care provider, has reported that more than half of its patient transactions are now conducted virtually using telehealth (video, telephony, or mobile devices and apps).[19] As health care organizations compete to increase their market shares, they must simultaneously meet consumers' demands for convenience and affordability.

Telehealth is critical to organizations looking to offer convenient alternatives to accessing care. Most large health care organizations offer telehealth services by partnering with vendors (exhibit 2). Health care organizations with retail pharmacy operations such as CVS and Walgreens are investing heavily in telehealth to offer their customers virtual health care visits in addition to their in-store clinics and pharmacies. In August 2018 CVS announced a nationwide rollout of telehealth services accessible through its CVS Pharmacy app,[21] while Walgreens and Rite Aid announced similar telehealth offerings in July 2018.[22,23] The Publix supermarket chain announced a telehealth partnership with BayCare Health System in October 2017.[24] Telehealth partnerships between retail chains and health care organizations make sense in the context of increasing market share by offering more convenient access points for consumers.

Telehealth, in the form of video or telephony, can generate data that may be analyzed for insights, such as information about a patient's health care status, emotional and physical conditions, and socioeconomic status. For example, video and audio data have been used to help train neural networks to detect and measure people's moods, emotions, and mental health conditions.[25–29] Researchers at the Massachusetts Institute of Technology, for example, trained a neural network to identify patients with depression by using audio and text data from interviews.[30] Without a doubt, telehealth data will be a valuable data source that health care organizations can analyze to obtain better patient insights, which may lead to competitive advantages.

Health care organizations recognize the value of data in strengthening their competitive advantages. For example, UnitedHealth has invested heavily in its data analytics capabilities through Optum as well as by acquiring the health informatics firm Humedica.[31] Other large companies, including Aetna and Humana, have also made data- and technology-related acquisitions (exhibit 3). Through horizontal and vertical integrations, these organizations have increased their access to valuable data across the health care supply chain that can be analyzed for business purposes.

EXHIBIT 2

Selected partnerships between large corporations and telehealth vendors

Corporation	Telehealth vendor
UnitedHealth	American Well, Doctor on Demand
Anthem	American Well
Aetna	Teladoc
Cigna	American Well, MDLIVE
Humana	Doctor On Demand, MDLIVE
CVS	American Well, Doctor On Demand, Teladoc
Walgreens	MDLIVE, NewYork-Presbyterian
Rite Aid	InTouch Health
Express Scripts	MedAvail
Walmart	Doctor on Demand
Amazon	—[a]

SOURCE Authors' analysis of data from company websites, mHealth Intelligence, and the *Wall Street Journal* (detailed sources available from the authors on request). **NOTE** The exhibit does not show a complete list. [a]Detailed information not located in publicly available sources.

Retail Outlets Competing In Health Care

Health care organizations are facing increasing competition from major retail outlets such as Walmart and Amazon, both of which are looking to expand into the $3 trillion health care industry. In 2018 Walmart engaged in preliminary talks to acquire Humana;[13] the supermarket chain Albertsons and Rite Aid discussed, but then abandoned, the idea of merging;[32,33] Amazon purchased the online pharmacy PillPack;[2] and JPMorgan Chase, Berkshire Hathaway,

EXHIBIT 3

Selected health technology–related acquisitions and investments by health care entities and retail outlets

Organization	Acquisitions	Investments
UnitedHealth	CareMedic (2009), Picis (2010), Humedica (2013), MedSynergies (2014), Alere Health (2014)	InfoMedics (2000), Rock Health (2012)
Anthem	Resolution Health (2008), 1-800-Contacts (2012)	Linkwell Health (2013), Movable (2013), American Well (2014)
Aetna	Healthagen/iTriage (2011), Bswift (2014)	—[a]
Humana	Anvita Health (2011), Certify Data Systems (2012)	Omada Health (2015), Livongo (2016 and 2017), Circulation (2017)
Cigna	Choicelinx (2005), Brighter.com (2017)	—[a]
Express Scripts	QPID Health (2016)	Mango Health (2017)
CVS Health	—[a]	MyHealthTeams (2015 and 2017)
Walgreens	—[a]	Theranos (2013), TytoCare (2014, 2015, and 2018), MedAvail (2014)
Walmart	—[a]	—[a]
Rite Aid	Health Dialog (2014)	—[a]
Amazon	PillPack (2018)	—[a]

SOURCE Authors' analysis of data from Becker's Hospital Review, Crunchbase, mHealth Intelligence, the *New York Times*, and the *Wall Street Journal* (detailed sources available from the authors on request). **NOTE** The exhibit does not show a complete list. [a]Detailed information not located in publicly available sources.

and Amazon formed a nonprofit health care venture led by Atul Gawande.[34,35] While their exact plans remain unclear, major retailers seem intent on entering the health care business more aggressively. Furthermore, many retail outlets already provide health care services. For example, Walmart operates the fourth-largest retail pharmacy network in the US by store count (and the third-largest by number of pharmacists),[36] and many other large retail chains operate pharmacies or clinics in their stores. Amazon is already a massive online supplier of health care goods and devices, selling more than a thousand varieties of wheelchairs online,[37] and its recent acquisition of PillPack provides the company with licenses to ship prescription drugs to all fifty states.[38] These developments indicate a clear trend on the part of both health organizations and retail outlets to compete by offering more convenient and accessible health care services.

Telehealth Enhances Competitive Advantages

National retail chains such as Walmart, CVS, and Walgreens have existing infrastructure, including physical locations and digital assets (websites and apps), while Amazon.com is one of the most popular sites on the internet.[39] These outlets are visited frequently, making them convenient channels for offering telehealth to consumers. It is estimated that in 2017, 95 percent of Americans shopped at one of Walmart's physical or online stores, while 64 percent of US households are Amazon Prime subscribers—many of whom go to Amazon.com or open the Amazon app at least once a week.[40–42]

Not all future advantages are with retailers, however, as vertically integrated health care organizations such as UnitedHealth already have established networks of hospitals, clinics, and providers to which they can refer patients for in-person follow-up visits following telehealth consultations. Retailers such as Walmart and Amazon, in contrast, do not own large provider networks or hospitals. As health care organizations such as UnitedHealth continue acquiring large provider groups and vertically integrating,[43] retail outlets may be left with a limited supply of providers with which to contract for in-person visits following telehealth services, particularly in certain regions of the country.

Policy Implications

While it is impossible to predict precisely how the health care industry will continue to evolve, telehealth is likely to be an increasingly significant factor for all entities competing to increase their market shares by offering more convenient access to health care services. The following are some of the policy issues that warrant further research, analysis, and consideration.

NET NEUTRALITY AND TELEHEALTH ACCESSIBILITY Telehealth, particularly video consultation, requires significant internet bandwidth. Telehealth data are transmitted through internet service providers. The major providers, such as Verizon and Comcast, own the underground copper and fiberoptic cables that constitute much of the US internet infrastructure. Without net neutrality, providers could theoretically charge more for transmitting high-bandwidth video or encrypted data, both of which would be required for telehealth. Much of the debate over net neutrality to date has focused on its impact on popular websites such as Netflix or peer-to-peer file-sharing platforms such as BitTorrent, but similar issues will apply to telehealth. Because telehealth has been particularly useful in providing care to underserved populations[44] and during natural disasters,[45,46] net neutrality policies should consider protections or exceptions for telehealth in certain circumstances. Conversely, current net neutrality laws may prohibit internet service providers from offering preferential bandwidth or reduced pricing for telehealth services that may benefit patient care. The effect of net neutrality on telehealth will depend on the specifics of the policy and its implementation, but more research and analysis could help inform the design and implementation of such policies and may be a significant factor in determining future patient access to care.

DATA PRIVACY AND SECURITY ISSUES Telehealth may introduce additional risks to patients' privacy and data security. Even though telehealth data are encrypted "end-to-end" and "in transit"—which means that the data are undecipherable even if intercepted—organizations authorized to access the data could analyze them for internal purposes. The Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule permits the use, disclosure, and sharing of protected health information for "treatment, payment, and health care operations."[47] Although these exceptions were intended to facilitate care delivery, payment, and efficient operations, reevaluation of these guidelines may be warranted given significant changes in technology and the health care market since the guidelines were last revised, in April 2003.

COMBINING PROTECTED HEALTH INFORMATION WITH CONSUMER DATA The HIPAA Privacy Rule's current guidelines may need further refinement in the context of telehealth data being used by retail outlets and vertically integrated health care organizations. Retail outlets and health care organizations have access to large amounts of consumer and patient data, respectively. Though health care organizations already purchase consumer data through data brokers,[48,49] current policies and regulations do not offer detailed guidance on circumstances in which one organization owns both consumer and patient data. The Privacy Rule provides guidance on the exchange of protected health information between covered entities, but it does not offer adequate guidance on the acceptable use of that information within an organization when that organization has operations outside of health care.

Large retailers and technology companies are looking to gather more data from people's homes,[50,51] which is one of the most common locations where patients conduct their telehealth sessions. Imagine if a retailer could have access to a patient's telehealth video session done in their living room. The recording could be analyzed to infer health condition and emotional state, leading to additional insights for marketing and sales. Policies regarding permission and consent may need modification to take these scenarios into account. Because some patients may agree to certain data collection and use, guidelines will have to be developed to ensure that patients have a clear understanding of how organizations are permitted to use their data and when their authorization is required.

INCREASED PROVIDER FLEXIBILITY As the health care market becomes increasingly consolidated, physicians tend to be employed by larger provider groups[52–54] and vertically integrated organizations.[55] Independent physicians will likely have increasing difficulty starting and operating small medical practices because they have weaker leverage in contract negotiations with insurers compared to larger provider groups, while federal antitrust provisions prevent small physician groups from bargaining collectively.[56]

Telehealth offers physicians an alternative to these single-employer contracts and creates opportunities to have more flexible working arrangements by allowing individual physicians to contract with multiple payers, provider groups, and retail outlets. Policies that support increased provider flexibility and practice independence are important considerations in an increasingly competitive environment, as more physicians are struggling with work-life balance, burnout, and depression.[57–59] Telehealth can play a valuable role in supporting physicians' well-being and maintaining a productive health care workforce. ■

NOTES

1 Mattioli D, Nassauer S, Mathews AW. Walmart in early-stage acquisition talks with Humana. Wall Street Journal [serial on the Internet]. 2018 Mar 29 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/walmart-in-early-stage-acquisition-talks-with-humana-1522365618

2 Terlep S, Stevens L. Amazon buys online pharmacy PillPack for $1 billion. Wall Street Journal [serial on the Internet]. [Updated 2018 Jun 28; cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/amazon-to-buy-online-pharmacy-pillpack-1530191443

3 Abelson R, Amazon Hsu T. Berkshire Hathaway and JPMorgan name C.E.O. for health initiative. New York Times [serial on the Internet]. 2018 Jun 20 [cited 2018 Oct 23]. Available from: https://www.nytimes.com/2018/06/20/health/amazon-berkshire-hathaway-jpmorgan-atul-gawande.html

4 Nikpay SS, Richards MR, Penson D. Hospital-physician consolidation accelerated in the past decade in cardiology, oncology. Health Aff (Millwood). 2018;37(7):1123–7.

5 Robinson JC. Consolidation and the transformation of competition in health insurance. Health Aff (Millwood). 2004;23(6):11–24.

6 Mathews AW, Kendall B. Anthem ends Cigna pursuit, plans to seek damages. Wall Street Journal [serial on the Internet]. 2017 May 12 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/anthem-ends-cigna-pursuit-plans-to-seek-damages-1494607748

7 Humer C, Bartz D. Aetna, Humana drop merger; Cigna wants to end Anthem deal. Reuters [serial on the Internet]. 2017 Feb 14 [cited 2018 Oct 23]. Available from: https://in.reuters.com/article/us-humana-m-a-aetna/aetna-humana-end-34-billion-merger-agreement-idINKBN15T1HN

8 Armstrong D, Martinez B. CVS, Caremark unite to create drug-sale giant. Wall Street Journal [serial on the Internet]. 2006 Nov 2 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/SB116238296523810065

9 Mathews AW. UnitedHealth to buy large doctor group for $4.9 billion. Wall Street Journal [serial on the Internet]. 2017 Dec 6 [cited 2018 Oct 23]; Available from: https://www.wsj.com/articles/unitedhealth-to-buy-major-doctor-group-for-4-9-billion-from-davita-1512560700

10 Mathews AW. Anthem to launch its own pharmacy-benefit manager. Wall Street Journal [serial on the Internet]. 2017 Oct 18 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/anthem-signs-five-year-deal-with-cvs-for-services-to-new-pharmacy-benefit-manager-ingeniorx-1508326194

11 Al-Muslim A. Stockholders approve CVS Health's acquisition of Aetna. Wall Street Journal [serial on the Internet]. 2018 Mar 13 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/stockholders-approve-cvs-healths-acquisition-of-aetna-1520961141

12 Mattioli D, Cimilluca D. Cigna agrees to buy Express Scripts for more than $50 billion. Wall Street Journal [serial on the Internet]. 2018 Mar 8 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/cigna-nears-deal-to-buy-express-scripts-1520482236

13 Mathews AW, Terlep S. Walmart-Humana talks put new pressure on remaining players in health care. Wall Street Journal [serial on the Internet]. 2018 Mar 30 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/walmart-humana-talks-put-new-pressure-on-remaining-players-in-health-care-1522439073

14 Baker LC, Bundorf MK, Kessler DP. Vertical integration: hospital ownership of physician practices is as-

sociated with higher prices and spending. Health Aff (Millwood). 2014;33(5):756–63.
15 Austin DR, Baker LC. Less physician practice competition is associated with higher prices paid for common procedures. Health Aff (Millwood). 2015;34(10):1753–60.
16 Gaynor M, Town R. The impact of hospital consolidation—update [Internet]. Princeton (NJ): Robert Wood Johnson Foundation; 2012 Jun [cited 2018 Oct 23]. Available from: https://www.rwjf.org/content/dam/farm/reports/issue_briefs/2012/rwjf73261
17 Dafny LS. Evaluating the impact of health insurance industry consolidation: learning from experience [Internet]. New York (NY): Commonwealth Fund; 2015 Nov [cited 2018 Oct 23]. (Issue Brief). Available from: https://www.commonwealthfund.org/sites/default/files/documents/___media_files_publications_issue_brief_2015_nov_1845_dafny_impact_hlt_ins_industry_consolidation_ib.pdf
18 Neprash HT, Chernew ME, Hicks AL, Gibson T, McWilliams JM. Association of financial integration between physicians and hospitals with commercial health care prices. JAMA Intern Med. 2015;175(12):1932–9.
19 Kokalitcheva K. More than half of Kaiser Permanente's patient visits are done virtually. Fortune [serial on the Internet]. 2016 Oct 6 [cited 2018 Oct 23]. Available from: http://fortune.com/2016/10/06/kaiser-permanente-virtual-doctor-visits/
20 Yellowlees P, Shore JH editors. Telepsychiatry and health technologies: a guide for mental health professionals. Arlington (VA): American Psychiatric Association Publishing; 2018.
21 Japsen B. CVS MinuteClinic launches video doctor visits via Teladoc platform. Forbes [serial on the Internet]. 2018 Aug 8 [cited 2018 Oct 23]. Available from: https://www.forbes.com/sites/brucejapsen/2018/08/08/cvs-minuteclinic-launches-video-doctor-visits-via-teladoc-platform/
22 Wicklund E. Walgreens launches an online marketplace for telehealth, mHealth. mHealthIntelligence [serial on the Internet]. 2018 Jul 26 [cited 2018 Oct 23]. Available from: https://mhealthintelligence.com/news/walgreens-launches-an-online-marketplace-for-telehealth-mhealth
23 Wicklund E. Rite Aid eyes telehealth kiosks in new deal with InTouch Health. mHealthIntelligence [serial on the Internet]. 2018 Jul 18 [cited 2018 Oct 23]. Available from: https://mhealthintelligence.com/news/rite-aid-eyes-telehealth-kiosks-in-new-deal-with-intouch-health
24 Wicklund E. Florida hospital, supermarket chain launch telehealth partnership. mHealthIntelligence [serial on the Internet]. 2017 Oct 23 [cited 2018 Oct 23]. Available from: https://mhealthintelligence.com/news/florida-hospital-supermarket-chain-launch-telehealth-partnership
25 Williamson JR, Godoy E, Cha M, Schwarzentruber A, Khorrami P, Gwon Y, et al. Detecting depression using vocal, facial, and semantic communication cues. In: AVEC '16: Proceedings of the 6th International Workshop on Audio/Visual Emotion Challenge; 2016 Oct 16; Amsterdam, The Netherlands.
26 Yang L, Jiang D, Xia X, Pei E, Oveneke MC, Sahli H. Multimodal measurement of depression using deep learning models. In: AVEC '17: Proceedings of the 7th Annual Workshop on Audio/Visual Emotion Challenge; 2017 Oct 23–27; Mountain View, CA.
27 Ma X, Yang H, Chen Q, Huang D, Wang Y. DepAudioNet: an efficient deep model for audio based depression classification. In: AVEC '16: Proceedings of the 6th International Workshop on Audio/Visual Emotion Challenge; 2016 Oct 16; Amsterdam, The Netherlands.
28 Cambria E. Affective computing and sentiment analysis. IEEE Intell Syst. 2016;31(2):102–7.
29 Poria S, Cambria E, Howard N, Huang G-B, Hussain A. Fusing audio, visual, and textual clues for sentiment analysis from multimodal content. Neurocomputing. 2016;174(Part A):50–9.
30 Al Hanai T, Ghassemi M, Glass J. Detecting depression with audio/text sequence modeling of interviews [Internet]. Paper presented at: Interspeech 2018; 2018 Sep 2–6; Hyderabad. [Cited 2018 Oct 23]. Available from: http://www.isca-speech.org/archive/Interspeech_2018/abstracts/2522.html
31 Conn J. Data battle: UnitedHealth deal is latest move in industry shift. Modern Healthcare [serial on the Internet]. 2013 Feb 2 [cited 2018 Oct 23]. Available from: http://www.modernhealthcare.com/article/20130202/MAGAZINE/302029973
32 Levingston I. Albertsons to buy Rite Aid in latest Amazon countermeasure. Bloomberg [serial on the Internet]. 2018 Feb 20 [cited 2018 Oct 23]. Available from: https://www.bloomberg.com/news/articles/2018-02-20/albertsons-to-buy-rite-aid-in-cash-and-stock-deal-wsj-says
33 Haddon H, Gottfried M. Rite Aid shareholders sour on Albertsons deal. Wall Street Journal [serial on the Internet]. 2018 Apr 12 [cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/rite-aid-shareholders-sour-on-albertsons-deal-1523543076
34 Mathews AW. Gawande to head health venture of Berkshire, Amazon, JPMorgan. Wall Street Journal [serial on the Internet]. [Updated 2018 Jun 20; cited 2018 Oct 23]. Available from: https://www.wsj.com/articles/amazon-berkshire-and-jpmorgan-pick-ceo-for-new-health-care-company-1529504379
35 Tracer Z. Amazon-Berkshire-JPMorgan health venture takes aim at middlemen. Bloomberg [serial on the Internet]. 2018 Jun 24 [cited 2018 Oct 23]. Available from: https://www.bloomberg.com/news/articles/2018-06-24/amazon-berkshire-jpmorgan-health-venture-takes-aim-at-middlemen
36 IQVIA. National pharmacy market summary: market insights report [Internet]. Irvine (CA): IQVIA; 2018 Jun [cited 2018 Oct 23]. p. 4. Available for download (registration required) from: http://www.skainfo.com/reports/most-powerful-pharmacies
37 According to an online search of Amazon.com on September 4, 2018, for *wheelchairs*.
38 Thomas K, Ballentine C. Why Amazon's push into prescription drugs isn't a guaranteed success. New York Times [serial on the Internet]. 2018 Jul 2 [cited 2018 Nov 1]. Available from: https://www.nytimes.com/2018/07/02/health/amazon-pillpack-drugs.html
39 SimilarWeb. Top websites ranking: top sites ranking for all categories in United States [Internet]. New York (NY): SimilarWeb; [cited 2018 Oct 23]. Available from: https://www.similarweb.com/top-websites/united-states
40 Hyken S. Sixty-four percent of U.S. households have Amazon Prime. Forbes [serial on the Internet]. 2017 Jun 17 [cited 2018 Oct 23]. Available from: https://www.forbes.com/sites/shephyken/2017/06/17/sixty-four-percent-of-u-s-households-have-amazon-prime/
41 Gustafson K. Nearly every American spent money at Wal-Mart last year. CNBC [serial on the Internet]. 2017 Apr 12 [cited 2018 Oct 23]. Available from: https://www.cnbc.com/2017/04/12/nearly-every-american-spent-money-at-wal-mart-last-year.html
42 Columbus L. 10 charts that will change your perspective of Amazon Prime's growth. Forbes [serial on the Internet]. 2018 Mar 4 [cited 2018 Oct 23]. Available from: https://www.forbes.com/sites/louiscolumbus/2018/03/04/10-charts-that-will-change-your-perspective-of-amazon-primes-growth/
43 Garnick C. Tacoma-based Sound Physicians sold for $2.2 billion. Puget Sound Business Journal [serial on the Internet]. 2018 Aug 31 [cited 2018 Oct 22]. Available (subscription required) from: https://www.bizjournals.com/seattle/news/

2018/08/31/sound-physicians-sold-optum-united-summit-partners.html
44 Odor A, Yellowlees P, Hilty D, Parish MB, Nafiz N, Iosif AM. PsychVACS: a system for asynchronous telepsychiatry. Telemed J E Health. 2011;17(4):299–303.
45 Doarn CR, Merrell RC. Telemedicine and e-health in disaster response. Telemed J E Health. 2014;20(7): 605–6.
46 Ajami S, Lamoochi P. Use of telemedicine in disaster and remote places. J Educ Health Promot. 2014; 3:26.
47 Department of Health and Human Services, Office for Civil Rights. Uses and disclosures for treatment, payment, and health care operations [45 CFR 164.506] [Internet]. Washington (DC): HHS; [revised 2003 Apr 3; cited 2018 Oct 24]. Available from: https://www.hhs.gov/sites/default/files/ocr/privacy/hipaa/understanding/coveredentities/sharingfortpo.pdf
48 Allen M. Health insurers are vacuuming up details about you—and it could raise your rates. ProPublica [serial on the Internet]. 2018 Jul 17 [cited 2018 Oct 24]. Available from: https://www.propublica.org/article/health-insurers-are-vacuuming-up-details-about-you-and-it-could-raise-your-rates
49 Leetaru K. How data brokers and pharmacies commercialize our medical data. Forbes [serial on the Internet]. 2018 Apr 2 [cited 2018 Oct 24]. Available from: https://www.forbes.com/sites/kalevleetaru/2018/04/02/how-data-brokers-and-pharmacies-commercialize-our-medical-data/
50 DeBusschere BD, Rogers JL. Assessing cardiovascular function using an optical sensor [Internet]. Mountain View (CA): Google Patents; 2018 Jan 4 [cited 2018 Oct 24]. Available from: https://patents.google.com/patent/US20180000355A1/en?oq=2018%2f0000355
51 Risley J. Amazon's Alexa to add Nest thermostat support as smart home ambitions expand. GeekWire [serial on the Internet]. 2016 Mar 3 [cited 2018 Oct 24]. Available from: https://www.geekwire.com/2016/amazon-to-add-nest-thermostat-support-as-smart-home-ambitions-expand/
52 Welch WP, Cuellar AE, Stearns SC, Bindman AB. Proportion of physicians in large group practices continued to grow in 2009–11. Health Aff (Millwood). 2013;32(9): 1659–66.
53 Peterson LE, Baxley E, Jaén CR, Phillips RL. Fewer family physicians are in solo practices. J Am Board Fam Med. 2015;28(1):11–2.
54 Liebhaber A, Grossman JM. Physicians moving to mid-sized, single-specialty practices. Track Rep. 2007; (18):1–5.
55 Kocher R, Sahni NR. Hospitals' race to employ physicians—the logic behind a money-losing proposition. N Engl J Med. 2011;364(19):1790–3.
56 Schiff AH. Physician collective bargaining. Clin Orthop Relat Res. 2009;467(11):3017–28.
57 Dewa CS, Loong D, Bonato S, Thanh NX, Jacobs P. How does burnout affect physician productivity? A systematic literature review. BMC Health Serv Res. 2014;14:325.
58 Haskins J, Carson JG, Chang CH, Kirshnit C, Link DP, Navarra L, et al. The suicide prevention, depression awareness, and clinical engagement program for faculty and residents at the University of California, Davis Health System. Acad Psychiatry. 2016;40(1):23–9.
59 Yellowlees P. Physician suicide: cases and commentaries. Arlington (VA): American Psychiatric Association Publishing; 2018.