

# PRIMARY CARE

*for the*

# 21<sup>ST</sup> CENTURY



TECHNOLOGY-ENABLED  
AND ON DEMAND



REPORT EXCERPT PREPARED FOR BRIGHT.MD

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***Primary Care for the 21st Century: Technology  
Enabled and On Demand***

**BRIGHT·MD**



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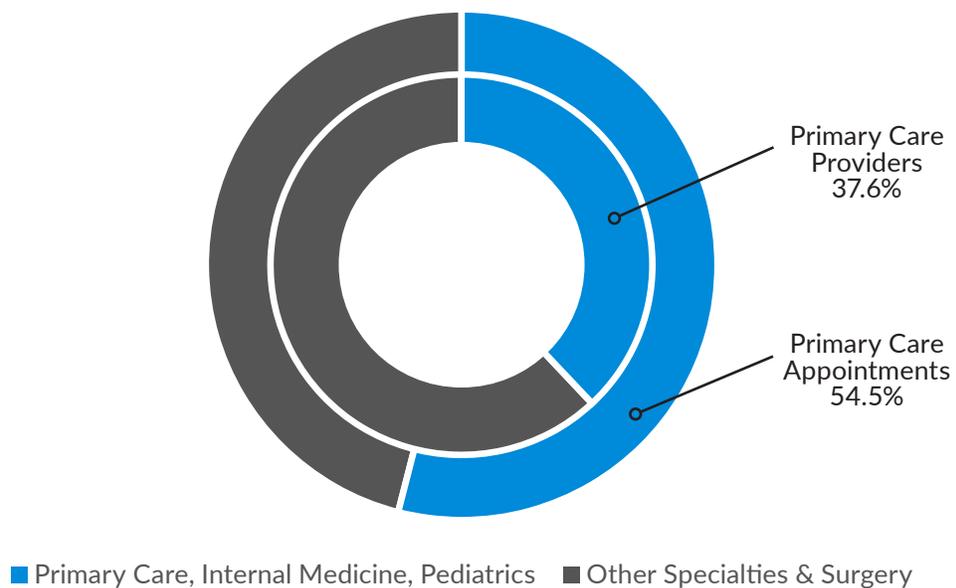


## Executive Summary

Primary care is the most common touchpoint in medicine, accounting for 54.5 percent of all U.S. healthcare appointments in 2016, in which a provider plays a central role in the definition and distribution of a patient's care. Historically, the primary care provider (PCP) acts as a central organizer, "helping the patient define the conditions under which entry to professional services and continuation in care are appropriate."<sup>1</sup> While other specialists see the patient when need arises, the PCP maintains an ongoing, longitudinal relationship. As patient demand has grown and provider supply has shrunk, this essential element of healthcare is facing a complete collapse, but with new technologies, providers and patients can begin to reinvent primary care practice for the 21st century. This report explores three evolving technology-enabled solutions that offer ways to make primary care more accessible and convenient for patients, and less burdensome for providers.

Research for the report is based on interviews with Primary Care Providers (PCP), advanced practitioners (AP), and executive leadership teams at regional health systems, independent practices, and academic medical centers. These individuals helped identify and clarify the benefits and challenges of technology implementation, along with their views of what elements of a product offered the most value to them or their patients. Twenty-one vendors in the identified spaces were interviewed and provided product demonstrations.

System Burden of Primary Care in 2016



Association of American Medical Colleges Active Physician List, 2016  
 CDC National Ambulatory Medical Care Survey, 2016

Figure 1: Healthcare Burden Largely Falls to Primary Care Setting

<sup>1</sup> Alpert, J. J., & Charney, E. (1974). The education of physicians for primary care. Washington: Health Resources Administration.

## KEY TAKEAWAYS

- > The U.S. primary care system no longer meets the needs of its patients or providers. New technological approaches combined with the drive to move care to lower cost settings are creating care models that better meet patient needs and are accessible on demand.
- > The Primary Care First (PCF) payment models from CMS will become the new normal for primary care reimbursement. In PCF, payments will be the same for services in or out of the office, with both upside and downside risk tied to quality and cost performance. These changes mean that providers and practices will need to do more to engage patients, maintain and improve patient health status, and improve the patient experience.
- > We describe three types of solutions that can contribute to or complement the modern technology-enabled primary care practice, promising to meet the challenges of increased demand, changing needs, and evolving payments. Each has different access, burden, and cost implications for providers and patients. We explore:
  - Telemedicine
  - Virtual and Remote Care Platforms
  - AI-Enabled Assistants, Symptom Checkers, and Chatbots

# The Primary Care System in Freefall

Primary care has evolved beyond coordination. Today, physicians and their staffs act increasingly as broad service providers. As systems concentrate professional services and specialties, or restrict access to them, PCPs find themselves forced to take on unfamiliar and clinically difficult roles. Chronic care management and preventative care account for more than 80 percent of PCP clinical hours. Many PCPs claim to have insufficient time to deliver what they consider adequate care for their patients. Minimum adequate patient care in three major categories—preventative care, chronic care management, and acute care—is estimated to require just over two hours per patient per year.<sup>2</sup> By that standard, a panel of 2000 patients would require almost 80 hours of active clinical time every week.

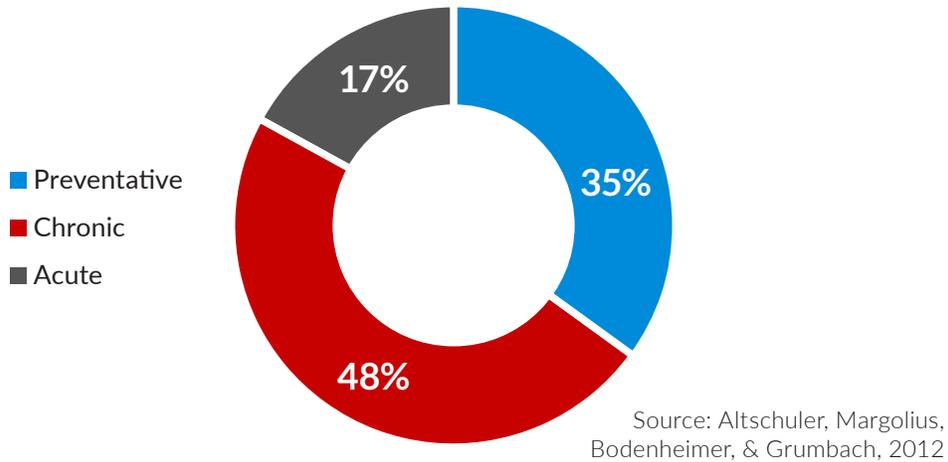


Figure 2: Use of Provider Time in Primary Care (U.S.)

Metrics of Primary Care Access in the United States	
<u>Adults with no reliable access to care</u> (not including ED)	17.3%
<u>Adults with no contact with medical professionals in the prior year</u>	34%
<u>Average wait time</u> for primary care appointment (major metropolitan areas only)	29.3 days
<u>Average wait time</u> for primary care appointment (major and mid-size municipalities)	54.3 days
<u>States with &lt; 50% of primary care needs met</u> (2018)	31
<u>Largest % of primary care need met</u> in a single U.S. state	77%

Table 1: Primary Care Access in the United States

Patients also struggle with the primary care experience. In many U.S. states, simple access to a PCP, or any care outside of an emergency department (ED), is hard to obtain. Lack of access has resulted in increased wait times for appointments and care delays that have only grown over time. Wait times in large cities have increased 50.3% since 2014. In smaller cities, wait times have gone up 178.8% in the same time period.

<sup>2</sup> Altschuler, J., Margolius, D., Bodenheimer, T., & Grumbach, K. (2012). Estimating a Reasonable Patient Panel Size for Primary Care Physicians With Team-Based Task Delegation. *The Annals of Family Medicine*, 10(5), 396-400. doi:10.1370/afm.1400

Patients then experience encounters in which the amount of time spent with a physician often feels unsatisfying and inadequate. A clear majority, 65 percent, believe that their time with physicians is always or often too limited. Only 11 percent believe they're given enough face-to-face time to receive the highest standard of care.<sup>3</sup>

Several other factors compound access challenges:

- > **Provider Retirement.** The median age of all physicians in the United States is just over 50,<sup>4</sup> but about 55 percent of primary care physicians are over age 50 and more than a quarter are over age 60.<sup>5</sup> The average age of retirement for all specialties is just over 65, with primary care coming in just under that.<sup>6</sup> Even with a major delay of physician retirements, at least 25 percent of primary care physicians in the United States are expected to retire by 2030.
- > **Lack of Replacement.** Primary care providers make up approximately 32 percent of the U.S. physician workforce, compared to a recommended 40 to 50 percent for optimal health outcomes and cost efficiency.<sup>7</sup> The actual proportion of PCPs has declined every year since 1961, as fewer medical students and new practitioners choose primary care. Over a ten-year period (1997–2006), the number of medical students pursuing generalist primary care specialties decreased between 57 percent (internal medicine) and 61 percent (family medicine).<sup>8</sup> The decreasing proportion of graduates choosing primary care means that retiring providers will not be replaced.
- > **Supply and Demand Imbalance.**<sup>3</sup> Projected increases in demand for primary care services are attributable to multiple factors:
  - The Affordable Care Act (ACA) and Medicaid expansion grew the insured population.
  - An aging population requires more frequent and more complex care.
  - There is already a national shortage of 13,800 full-time equivalent (FTE) providers. Even with optimistic growth in the provider population, projections show the shortfall growing to between 14,800 and 49,300 FTEs by 2030.<sup>4</sup>

<sup>3</sup> 2017 Survey of Physician Appointment Wait Times. (n.d.). Retrieved from <https://www.merritthawkins.com/news-and-insights/thought-leadership/survey/survey-of-physician-appointment-wait-times/> (2017)

<sup>4</sup> Young, A., Chaudhry, H. J., Pei, X., Halbesleben, K., Polk, D. H., & Dugan, M. (2015). A census of actively licensed physicians in the United States, 2014. *Journal of Medical Regulation*, 101(2), 7-22.

<sup>5</sup> Dall, T. (2018). *The Complexities of Physician Supply and Demand: Projections from 2016 to 2030*. Washington, D.C.: IHS Markit.

<sup>6</sup> Petterson, S. M., Rayburn, W. F., & Liaw, W. R. (2016). When Do Primary Care Physicians Retire? Implications for Workforce Projections. *The Annals of Family Medicine*, 14(4), 344-349. doi:10.1370/afm.1936

<sup>7</sup> Starfield B. (2001). New Paradigms for Quality in Primary Care. *The British Journal of General Practice*, 51(465), 303–309.

<sup>8</sup> Jeffe, D. B., Whelan, A. J., & Andriole, D. A. (2010). Primary Care Specialty Choices of United States Medical Graduates, 1997–2006. *Academic Medicine*, 85(6), 947-958. doi:10.1097/acm.0b013e3181d8e77d

# The Primary Care Evolution

## SOLUTION TYPES

Technology has introduced new tools for delivering primary care in ways that can help address these pressures. Three evolving technology-enabled solutions, explored below, offer to make primary care more accessible and convenient for patients and less burdensome for providers.

### Telehealth

Telehealth offerings—online or telephonic encounters scheduled like in-person office appointments—have gained considerable momentum over the last 10 to 15 years as a way to deliver primary care. All telehealth use has been growing since 2005 (a compound annual growth rate (CAGR) of 43 percent until 2014), but usage grew enormously between 2015 and 2017 (CAGR 261 percent). In 2017, primary care became the most frequent telehealth appointment type.<sup>9</sup> Telehealth providers have generally targeted appointments for minor illnesses or injuries in low access areas.

The main obstacles to telehealth adoption are reimbursement and provider licensing. Historically, payer reimbursements for telehealth encounters were lower than equivalent office-based encounters. Private payers have increased reimbursements in response to state-level laws that require reimbursement parity between telehealth and in-person encounters. CMS traditionally paid less for telehealth and limited availability based on geographic and service factors. It plans to ease these restrictions in 2020.<sup>10</sup> In addition to these reimbursement disparities, providers can only practice in the states where they are licensed, limiting their ability to deliver telehealth appointments to patients in other states.

### Virtual and Remote Care Platforms

Virtual and remote care offerings are new tools that, unlike telehealth, complement rather than replace primary care appointments. Virtual care platforms help with patient engagement and home care management; remote care platforms help monitor patients. While retail clinics and telehealth typically address immediate needs, these virtual and remote tools address the single largest demand on PCP time: chronic care management. With the ongoing push to move healthcare from volume to value, improved home monitoring of chronic patients provides valuable information to help meet cost and quality targets.

Reimbursement for virtual and remote care has been a challenge. Current technology offers a variety of options for monitoring and tracking vitals in the home, but reimbursement has lagged, especially for Medicare patients who make up the bulk of chronic and polychronic patients. In 2019, CMS expanded reimbursement for remote care, offering new billing opportunities for initial set-up costs, monitoring activity, and patient interaction.

<sup>9</sup> Barnett, M. L., Ray, K. N., Souza, J., & Mehrotra, A. (2018). Trends in Telemedicine Use in a Large Commercially Insured Population, 2005-2017. *JAMA*, 320(20), 2147. doi:10.1001/jama.2018.12354

<sup>10</sup> Medicare and Medicaid Programs; Policy and Technical Changes to the Medicare Advantage, Medicare Prescription Drug Benefit, Programs of All-Inclusive Care for the Elderly (PACE), Medicaid Fee-For-Service, and Medicaid Managed Care Programs for Years 2020 and 2021, 42 CFR Parts 422, 423, 438, and 498 (April 16, 2019)

## AI Assistants, Chatbots, and Symptom Checkers

Like virtual and remote care platforms, AI Assistants, chatbots, and symptom checkers supplement and assist in care, rather than replace traditional office encounters. These include tools for transcription, scheduling, medical coding, and pre-authorization, either to provide clinician decision support or to help patients. Symptom checkers and triage tools give patients access to initial diagnosis and care plans on demand while reducing unnecessary appointments and the number of triage calls occupying staff and provider time. Some tools use machine-learning (ML) algorithms, while others utilize sophisticated decision trees.

Whether these tools can reliably identify symptoms accurately and offer appropriate advice is unproven. They tend to over-diagnose and recommend more acute care than is needed, limiting both their effectiveness for patients and their ability to complement primary care.<sup>11</sup>

## FUTURE IMPACT ON PRIMARY CARE

To understand the advantages and disadvantages of new technology-enabled options in primary care, we examine how each solution affects three important aspects of the primary care experience, for both patients and providers: access, burden, and cost. Examples from selected vendors show how primary care practices are using these technologies currently, and how they can offer new value.

### Access

Access is the ability of patients to receive care in an interaction with a clinician. For patients, it includes direct appointments, real-time or asynchronous communication with a provider that results in productive feedback, and the ability to schedule appointments or other care needs. For providers, access includes the ability to contact patients, to receive feedback or data on patient status, and to return productive information with appointments, phone calls, and messaging through patient portals, emails, or texts.

### Burden

Burden is the non-clinical effort or work required for care to occur, as well as the physical time spent in appointments or other tasks. For patients, this includes required travel, wait times, appointments, and the work required to provide necessary data or information. For providers, it includes appointments and other tasks, retrieving and making productive use of information, and administrative work that does not require a clinical license.

### Cost

Cost includes both the direct and indirect costs of care, along with opportunity costs. For patients, this includes out-of-pocket copays and deductibles plus lost time at work or school. It can also include equipment or infrastructure costs, such as high-speed internet or home monitoring equipment. For providers, it includes staff costs, but also opportunity costs in allocating staff and provider time. It includes the cost of equipment or infrastructure. Additional reimbursements or savings from reduced utilization can also offset costs.

<sup>11</sup> Semigran, H.L., Linder, J.A., Gidengil, C. & Mehrotra, A. (2015). Evaluation of Symptom Checkers for Self Diagnosis and Triage: Audit Study. *BMJ*, 351:h3480 doi:10.1136/bmj.h3480

# Enabling Primary Care Through Technology

Please refer to [full report](#) to see Telehealth and Virtual/Remote Care research.

## AI ASSISTANTS, SYMPTOM CHECKERS, CHATBOTS

Providers have deployed AI tools in several areas, from phone, tablet, or web apps, to components of larger remote care platforms, to point-of-contact questionnaires for primary care practices or urgent care clinics. In triage, these tools can direct patients to in-person care based on system goals or definitions, as well as distribute patients to care locations based on acuity, wait time, and system preference. When integrated into scheduling or telehealth tools, AI tools can assist in creating appointments or starting a remote appointment.

Of the three technologies under review, symptom and triage checkers can be an initial point of entry for patients. Their ability to correctly diagnose patients and direct them to the appropriate site of care is their single most important metric of functionality. It's also the single greatest value they have to a health system or primary care practice.

These systems can offer important provider and administrative time savings, especially when used as system components rather than stand-alone solutions—but it's unclear exactly how much appointment time these tools save overall. They provide patients a quicker response and, if integrated into a scheduling system, potentially a much more accessible entry point into the appointment and care system. They can save staff time, as well as the time of nurses, APs, or providers who would otherwise consult on triage calls and patient questions. They adjust the distribution of appointments, saving PCPs time in the acute care category. They can potentially replace a repetitive intake process that occupies significant provider time.

When integrated into virtual care, remote care, or telehealth platforms, these AI solutions offer ways to complete clinical interviews, get patient status updates, and engage patients on an asynchronous, as-needed schedule, while also reducing administrative and below-top-of-license work and increasing available clinical time. Revenue impact comes from cost savings and redirection to reimbursable work. Some vendors estimate a cost savings of between \$150 and \$175 per encounter in staff time saved and the replacement of lower reimbursement acute care appointments with more valuable uses of provider time.

Serving as points of first contact, these tools are already seeing widespread use, reducing reliance on call centers. As the technology improves and provider confidence grows, consumer demand can only grow alongside it. In the next five years, use of AI chatbots for scheduling and initial contact will be standard practice for most health system call centers. A system triage and diagnostic app that can recommend treatment, locate care services, and schedule an appointment will be considered a basic service of any healthcare system.

	Patients	Providers
Access	<ul style="list-style-type: none"> <li>&gt; Remote and asynchronous communication on demand</li> <li>&gt; No restrictions on time of day or location</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Reduces unnecessary appointments and communication</li> <li>&gt; Redirecting low acuity appointments opens in-person appointments for higher need patients</li> </ul>
Burden	<ul style="list-style-type: none"> <li>&gt; Easy to access through phone or apps</li> <li>&gt; No travel required</li> <li>&gt; Quicker results for diagnosis and treatment options</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Reduces need for staff and provider involvement in triage recommendations</li> <li>&gt; Potential to reduce provider non-clinical tasks through pre-visit data collection</li> <li>&gt; Potential loss of accuracy in patient health record</li> </ul>
Cost	<ul style="list-style-type: none"> <li>&gt; Low to no cost</li> <li>&gt; Less loss of work and/or school time</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Improved utilization of staff and provider time, less interruption to workflow</li> </ul>

Table 6: Effects of AI Assistants, Symptom Checkers, and Chatbots on Primary Care

## Major Players and Vendors to Watch\*

### BRIGHT.MD

Portland, OR

Founded 2014

Product Differentiators:

- > True machine learning (ML) for conducting evaluations and constructing notes
- > Asynchronous diagnosis with direct provider review
- > Billing, treatment, prescription, and next steps as needed and on demand

Bright.md combines telehealth activity with an AI-powered medical questionnaire. The platform is integrated with a healthcare system's EHR and provider workflows, and patients are given access through a patient portal or an app. This allows the tool access to patient records, calculated risk groups, and patient history. The platform uses an ML engine to conduct a clinical evaluation interview and constructs a preliminary diagnosis and SOAP (Subjective, Objective, Assessment, Plan) note. A provider reviews the assessment and note, requests additional information if necessary, or approves the prepared treatment plan. The platform communicates next steps, including referrals or prescriptions if necessary, directly to the patient, their chosen pharmacy, or other stakeholders.

"Appointments" occur as needed and are evaluated asynchronously. Provider workflow involves only direct clinical evaluation and judgment, significantly reducing active provider time. This addresses one of the biggest weaknesses of the telehealth field, as appointments are still heavily time restricted and a number of information and survey questions are still necessary.

- > **ACCESS:** Bright.md allows patients to access care 24/7 from their known provider.
- > **BURDEN:** No appointment needed, care can be accessed from any location at any time. Asynchronous review means no delay in initiating communication. Response time is variable so total cycle time can be extended. For providers, evaluation time is significantly reduced. Requires available staff for all active hours, and response time is limited by assigned staff. For systems, staffing requirements scale directly with number of users.
- > **COST:** Cheaper for patients in both monetary and opportunity cost. Reduces reliance on sick days, need for travel and transportation. Billable as CPT 99444: Non-Face-to-Face Online Medical Evaluation.

\*Other vendors profiled in this section in the original report include Ada Health and Aiva Health

## About the Author



Alex Lennox-Miller joined the Chilmark Research team in 2018, as a research analyst specializing in provider-payer convergence. His work focuses on value propositions for HCOs and payers, particularly in the implementation and potential use cases of analytic and workflow packages for clinical, administrative, and financial areas. From value-based payments and population health quality to revenue cycles and staff appointments, Alex believes that improved understanding and use of HIT is essential in providing the best possible care for patients, as well as improving the lives of clinical providers.

Before joining Chilmark, Alex was the senior business analyst for Process Improvement Operations in Lahey Health System, where he learned first-hand the challenges and value in implementing analytic programs and an analytic mindset in the healthcare setting. Prior to that, he was the founder of KSVL Consulting and specialized in providing accounting, finance, and business model consulting to start-ups and new businesses in Greater Boston. His background in process engineering and financial analysis comes from Northeastern University, where he earned his MBA in 2016.



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