



Closing care gaps: How AI is helping to transform diabetes care management

aetna.com
34.03.367.1





Artificial intelligence (AI) and machine learning are not new phenomena in health care. What is new is unlocking the potential of these tools to help support better clinical and economic outcomes in treating chronic conditions. Take diabetes, a chronic condition endured by more than 34 million adults in the U.S. Each one of those 34 million is affected differently by the disease. Applied correctly, AI can interpret data in a way that serves as the foundation for a more personalized approach to diabetes care management. But effectively applying AI-driven insights to make a difference in these individual lives has been missing. Existing approaches have failed to recognize that individuals respond uniquely to different health interventions, let alone identified the ones that drive better health outcomes while also delivering value throughout the health care system. In this paper, we will demonstrate how this can work in practice as it pertains to helping individuals with diabetes manage the unique circumstances of their chronic conditions.

Too often, AI in health care operates in a vacuum. The burden is on human intelligence to wield AI effectively while also creating a system where the recommendations AI makes can be implemented in the most impactful way — and be shared across the individual's care journey. This is where the ongoing decentralization of health care — i.e., offering care and interventions across multiple channels and touchpoints — becomes an essential component to delivering better outcomes for those with complex chronic conditions.

Despite the influx of new digital and physical touchpoints — from mobile apps to urgent care clinics — digital-only solutions remain largely unconnected to the delivery of patient care and thus fail to effectively implement the interventions recommended by AI into a holistic care plan.

To this end CVS Health® and Aetna® have applied AI and machine learning to identify gaps in care that can be communicated by our omnichannel approach to health. By developing and implementing a wide variety of clinical and nonclinical interventions that can be selectively applied based on guidance from AI, we can help identify and subsequently close the most important gaps in care for people based on their communications preferences and behavior patterns, delivering on AI's big potential. Specifically, we have applied this approach in our Transform Diabetes Care® (TDC) offering, which has seen positive early results in closing gaps in care.



The opportunity amid a changing health care landscape

Radical shifts in health care

In recent years, the state of health care has been in flux. The health care landscape has been upended by the explosion of new digital services like telemedicine and the expansion of nontraditional sites of care like urgent care centers. Players in markets adjacent to health care, like Amazon and Walmart, have expanded aggressively into this space, while new start-ups and challengers are harnessing digital methods of all kinds to unlock value. That change is only accelerating. In the first six months of 2021, for example, [digital health start-ups received \\$14.7 billion](#) in funding, more than the entire amount funded in 2020.

Telemedicine has been one beneficiary of this trend. Especially in the wake of COVID-19, telemedicine has soared in popularity. In response to the ongoing pandemic, governments at all levels in the U.S. and across the world have [updated telemedicine laws](#) to make it easier to consult with a provider over phone or video conferencing. [The sudden adoption of telemedicine has been dramatic](#): Before the pandemic, a mere 1 in 10 U.S. patients used telemedicine services, but now demand has skyrocketed, and appointments through services like PlushCare and Amwell are up 70 percent and 158 percent, respectively. While virtual care like this has produced incremental

gains in caring for chronic conditions like diabetes, it's still episodic in nature, dependent on the doctor's schedule and other external factors.

New urgent care clinics have also seen a surge in the last few years, from independent chains of clinics to offerings provided at existing sites like big-box stores and CVS MinuteClinic® and HealthHUB® locations. The number of urgent care sites [has ballooned](#) from 6,400 in 2014 to 8,100 in 2018. And like with telemedicine, COVID-19 has only quickened the pace of adoption: [Research has shown](#) that there was a 58 percent increase in visits to urgent care facilities in 2020 alone.

At the same time, in-person consultations with non-doctor clinicians like pharmacists and home health providers have also jumped. According to internal CVS Health research, 87 percent of survey respondents said that they “rely on their pharmacist for health advice,” while 80 percent agree that “a pharmacist is a credible resource for health care information beyond prescriptions, prescription consultations and [over-the-counter] product recommendations.”¹

Overall, these seismic changes have transformed the health care landscape, decentralizing medical services into communities, into homes and onto smartphones. But with decentralization has also come fragmentation, as there has been a huge increase in nontraditional channels and touchpoints for care without any accompanying efforts to connect them.

¹ 2020 CVS Health and/or one of its affiliates.

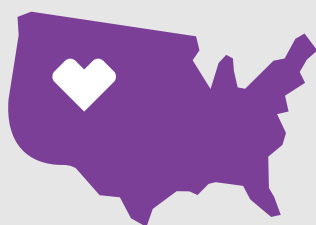
The promise of AI in treating diabetes

Enter AI. New AI technology, including machine learning, that uses insights generated by data to offer specific health interventions has the potential to connect these unconnected dots in the changing health care landscape. It's not incremental — it's disruptive and transformative. And both traditional and nontraditional players are crowding into this space: In a recent survey conducted by Sage Growth Partners, awareness and adoption of AI and automation in health care have risen significantly. The number of large health care organizations, for example, with an AI and automation strategy nearly doubled last year, from only 53 percent to 90 percent today.² This trend mirrors the general rise of AI in society, with the number of AI-related patents increasing by more than 100 percent from 2002 to 2018 and

the share of all patent applications that contain AI growing from 9 percent to nearly 16 percent.³ And in general, the barriers to adoption of AI in health care have come down, including the availability of AI and decrease in the relative cost to develop AI. At the same time, regulatory guidance and clarity have offered a clearer roadmap for success.

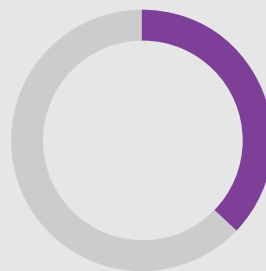
AI's ability to connect the dots in the new decentralized health care landscape comes up short when the tech is deployed in a vacuum, because new approaches require not just many kinds of data, but a surrounding digitally connected, clinical ecosystem that supports individual patients. There is no better example of an area where this requirement is clear than diabetes care.

The problem of diabetes care



34M

adults in the U.S.
have diabetes.



37%

of people with
diabetes also have
kidney disease.

²“The State of Healthcare Automation: Urgent Need, Growing Awareness, Tremendous Potential,” A Sage Growth Partners Survey, February 2021.

³“Inventing AI: Tracing the Diffusion of Artificial Intelligence with U.S. Patents,” Office of the Chief Economist, IP Data Highlights, U.S. Patent and Trademark Office, October 2020.

Diabetes is a huge burden on the health care system and a serious challenge to treat, with 34 million Americans living with the disease. [The American Diabetes Association reports](#) that the total cost of diagnosed diabetes in 2017 was \$327 billion, including \$237 billion in direct medical costs and \$90 billion in reduced productivity.

And diabetes patients instinctively understand that more can be done on the personalization front (which includes AI-generated solutions): [According to one survey](#), when asked about the potential benefits of a device that automatically brings diabetes data together for people living with the disease, 79 percent felt that such an offering would give them a more personalized understanding of their diabetes, while 75 percent said that such a device would make them feel more empowered when it comes to managing the disease.

Where current solutions fall short is that digital-only ones — mobile apps bolted on to customer experiences, for example — don't go far enough in generating the full value of AI. That's because they don't have the ability to connect insights to actual impact as measured in actionable steps taken by each patient in response to the insights gleaned from applying intelligence to data.

In addition to having access to comprehensive, relevant data on specific patients, AI providers must also reinforce their solutions with a supporting ecosystem of touchpoints (digital and nondigital channels) that is able to spur impact from data-driven insights on an individual level. Nearly all of them fail to do so.





How TDC supports care based on each member's needs

CVS Health and Aetna, on the other hand, are ideally positioned to help support AI's enormous potential for better, more efficient care in diabetes because its capabilities extend well beyond digital offerings. Its omnichannel approach aims to support effective and personalized care with advanced data and analytic capabilities, customized communications and a broad set of channels. It's driven by an overarching view of member needs and the most impactful interventions to address them.



“Each member with diabetes brings their own unique set of issues — social, psychosocial, biological — and other contextual issues that make the delivery of care challenging to begin with. Every diabetic patient has unique needs.”

– Dan Knecht, MD, MBA, Vice President of Clinical Product, CVS Health

Indeed, CVS Health and Aetna are now able to connect one-on-one with members in certain contexts. The company's analytics engine analyzes member data and determines an appropriate level of support for that specific member, then recommends different levels of outreach based on the individual clinical situation and the severity of the patient's condition. Some members will need “high touch” support, with personal, live and in-person engagement at a CVS Pharmacy®, CVS HealthHUB or MinuteClinic location, or over the phone from the TDC care management team. Every communication with a member is focused on a specific opportunity and based on the underlying data, along with that member's communications preferences. Each

additional channel available to reach members provides additional opportunities to CVS Health and Aetna, because each enhances learning about individual members and how they want to be engaged. The TDC program's use of multiple channels for outreach to support greater member engagement and improved quality of care gives TDC a unique advantage.

We can see this comprehensive AI and data omnichannel approach in action with TDC, which follows the model described above to help transform the management of a complicated disease that, with its high number of comorbidities, often results in complex conditions for individual members.

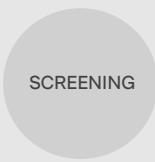
The TDC three-step process



Alice
F, 26

Alice is a healthy young person who should stay current with the screenings recommended by her doctor for comorbidities to help reduce the possibility of a harder-to-treat, more expensive and complex condition developing.

The TDC process identifies **one** gap-in-care category for Alice:



Alice has controlled type 1 diabetes with an A1C of **7.9**.



Eleanor
F, 49

Eleanor is an unhealthy middle-aged person who would benefit from several targeted interventions to control her diabetes.

The TDC process identifies **four** gap-in-care categories for Eleanor:



Eleanor has uncontrolled diabetes with an A1C of **12.1**.

Step one: Member identification

Using multiple sources of data, we create a comprehensive view of each member:



Rx claims/medical claims/lab results/blood glucose and A1C data/ blood pressure readings/ demographics and other.



This data is continually updated to keep the view of each member current.

Step two: Customized interventions

TDC combines data, AI and clinical resources to pinpoint personalized next best actions for each member:



Identifies and prioritizes gaps in care for members with complex conditions based on accepted clinical guidelines.



AI estimates the impact of care gap opportunities for each member.



Activating our ecosystem, we use an omnichannel approach to identify prioritized gap-in-care opportunities, optimize engagement and meet members where they are.



Learning about what works best for each member feeds back into the process, constantly enhancing the individualized experience.

Step three: Member impact

Using insights, we monitor member results and measure improved health outcomes for individuals:



Helps optimize member engagement.



Helps to reduce hospitalization and surgery claims.



Helps reduce A1C and blood pressure.



Helps delay progression toward need for dialysis.

Other diabetes and comorbidity management programs — where digital channels but not in-person ones are available — are typically anything but customized. Instead, they are “one size fits all,” offering the same intervention for every member, regardless of individual circumstances. Further, these approaches are limited to only two broad clinical areas: blood glucose monitoring and lifestyle and comorbidity management. These clinical areas are used for all members, whether they are controlling their diabetes or not. A member might not need monitoring or lifestyle coaches — based on their unique profile — but with the rough hammer of one-size-fits-all care, they get them anyway. On top of the unnecessary and wasteful care, the program has the same price, no matter the level of intervention required for individual members.

In the real world, each member has different needs and requires different (or even no) interventions. As an interim Aetna analysis of TDC points out: “The next best intervention expected to yield the highest impact on diabetes control is highly dependent on member features including comorbidity profiles, treatment adherence and lifestyle factors.”⁵

TDC provides a machine learning and game theory combinatorial method “to identify which clinical features and gaps in care are most influential in controlling [A1C] on a member level, i.e., their next best actions to control their health.”⁶ Building on this foundation, the program offers a thorough set of interventions to help members manage diabetes more effectively.⁷

Unlike typical approaches, TDC operates across five clinical areas instead of only two:



blood glucose monitoring



lifestyle and comorbidity management



guideline-driven screenings



adherence to medication



taking the right medication

It’s an approach that aligns with the guidelines of the American Diabetes Association (ADA).

But it’s what happens next that really sets TDC apart. Based on AI-generated insights into these five clinical areas, the program helps identify specific next best actions to each member. These

interventions are not just digital but include face-to-face pharmacist and care team consultations and all-remote support, including email, text and telephone. Whether in person at a CVS

⁵ “Next Generation Transform Diabetes Care (ngTDC): April 2021 Interim Analysis,” Lauren Lamonica, Paul Raff, Molly Srour, Noga Neeman, Eugenio Zuccarelli, Brian Lynch, and Eli Goldberg. Aetna Research, 2021, p. 1.

⁶ Ibid.

⁷ Ibid.

HealthHUB or MinuteClinic location (or virtually at a MinuteClinic) or CVS Pharmacy location, on the phone or in person with a certified diabetes nurse, or through any of the digital touchpoints available through the tracker app, members with diabetes receive multiple targeted nudges with information about gaps in care opportunities

And these five areas are where gaps in care occur. According to a recent Aetna analysis, 69 percent of members have two or more gaps in care: 70 percent have an open lifestyle and comorbidity

gap (i.e., need help with nutrition, exercise or other areas), 58 percent do not get screenings, 28 percent do not have an optimal medication regimen, 11 percent could benefit from testing blood glucose, and 10 percent show suboptimal adherence to their medication regimens.

Interim results suggest that TDC drives statistically significant incremental behavior change, with the treatment closing 9.4 percent more gaps than a control group with no targeted interventions.⁸

The TDC potential:



2:1

guaranteed return
on investment



1.9%

average A1C reduction



Up to

15 mm/Hg

reduction in systolic
blood pressure

TDC closing gaps in care:

Our initial TDC results indicate that there have been statistically significant decreases in open care gaps (and a statistically significant decrease in the prevalence of member-level care caps) and a statistically significant increase in closed care gaps per member.

⁸ CVS Health, 2021.

Closing these gaps saves time, money and resources, enabling TDC to focus on the highest-impact interventions while supporting comprehensive, appropriate care for every single diabetes patient.

Conclusion

While it is still early, these positive interim results show the promise of TDC — and of AI properly applied — to have impact in helping members close gaps in care when it comes to complex conditions like diabetes (and comorbidities). Insights into next best actions by themselves are not sufficient through digital channels alone to make a difference. But when coupled with an extensive ecosystem of in-person and digital channels, these insights can more effectively help engage members to take the actions needed to close costly gaps in their diabetes care.

And this is just the beginning. The team plans to assess the TDC model's specific impact on quality improvement by measuring both medical and financial outcomes. This learning will itself inform the ongoing machine learning and make its gap in care identification even stronger — emphasizing the interventions that have the biggest impact at the lowest cost.

“What’s coming in the future is prevention based on signals in the data. That is, preventing illness from happening in the first place instead of coming in after someone is sick to do a primary, secondary or even tertiary intervention.”

– Dan Knecht, MD, MBA, Vice President of Clinical Product, CVS Health

