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Beyond the hype: Adopting meaningful AI in healthcare

Abstract

This whitepaper explores how Netsmart is working alongside Amazon Web Services (AWS) and community-based healthcare organizations to incorporate innovative technology that drives meaningful outcomes for consumers. Modern healthcare systems have access to unprecedented amounts of information, generated from individual encounters, community databases, nongovernmental organizations, and other external sources. Using tools built on cutting-edge generative artificial intelligence (AI) and machine learning (ML), organizations can harness data to simplify the user experience and transform healthcare from reactive to predictive. These game-changing technologies empower healthcare professionals by reducing burnout, boosting efficiency, and ultimately improving health outcomes among entire communities.

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"Do the best you can until you know better. Then, when you know better, do better."

–Maya Angelou

Introduction: Meaningful AI in Healthcare

The AI revolution

Vehicle lane departure warnings. Credit card fraud detection. Personalized recommendations to stream a movie. Digital assistants such as Alexa. Consumers interact with AI every day—sometimes without even realizing it. Rule-based AI and predictive AI using historical data are becoming increasingly familiar through common applications. Artificial intelligence already works behind the scenes to make lives easier, using computer systems to perform tasks that are typically done by humans. With the advent of generative AI, which uses large language models (LLMs) to synthesize, summarize, and interrogate massive amounts of unstandardized data, a new wave of AI-powered capabilities will support every aspect of our daily experience.

Across 63 use cases studied in healthcare, banking, high tech, and other industries, the impact of AI could increase by 15–40 percent annually[1], as digitization provides a foundation for organizations to optimize processes, enhance creativity, and personalize the user experience. That estimate roughly doubles when it includes the impact of embedding generative AI into software used for tasks beyond the particular use cases studied.[2]

[1] https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#introduction

[2] https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#introduction

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Exciting, groundbreaking opportunities await. The use of natural language processing (NLP) generates high-quality, humanlike content. By 2025, AI could power 95 percent of customer interactions through the use of chatbots and online forums.[3] Machine learning helps users to synthesize data and produce meaningful insights. Some estimates indicate that half of today's work activities could be automated between 2030 and 2060[4], helping to alleviate the drudgery of manual tasks so that workers can focus on more strategic initiatives.

But even as advancements in AI technologies are helping to drive the market's growth, it's difficult for organizations to understand how to cut through the noise and use AI to deliver real value. Highly functional, meaningful solutions at scale depend on collaboration: among industry technology companies, cloud computing and AI experts, and the users themselves.

[3] https://aibusiness.com/automation/ai-will-power-95-of-customer-interactions-by-2025

[4] https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#introduction

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The potential in healthcare

In healthcare, AI is helping to produce meaningful outcomes for individuals. Rather than implement technology simply to recreate the physical world, the intentional, meaningful use of AI produces what the American Medical Association calls augmented intelligence[5]. Augmented intelligence focuses on ways in which AI can assist human capabilities, a kind of partnership between AI and healthcare professionals. It requires providers have tools that are using data that is stored in different formats across government, nonprofit, and commercial enterprises; bringing that data together—even without AI—has been shown to improve value by 33 percent.[6] AI-powered tools enhance human intelligence rather than replacing it, synthesizing data in intuitive ways to provide more accurate diagnoses suggestions, personalize treatment plans, reduce the documentation burden for clinicians, and improve the health and wellbeing of entire communities.

[5] https://www.ama-assn.org/practice-management/digital/augmented-intelligence-medicine

For example, the detection of common barriers to post-acute care among hospitalized older adults can help avoid negative outcomes.[7] Clinicians can rely on the use of NLP of clinical notes from early in an individual's hospitalization to learn a person's preferences. This helps with early interventions to educate the individual and proactively address any concerns.

The documentation of clinical and support services is critical for quality care and proper reimbursement. But the mission of clinicians and providers to help individuals often diverts into significant time spent on paperwork. The burden of paperwork results in burnout that takes a tremendous toll on the quality of care and results in approximately $4.6 billion in costs related to physician turnover and reduced clinical hours.[8] In fact, staff members can spend up to 40 percent of their time—a full 2 days[9]—on clinical documentation. Despite this extraordinary time commitment, between 15–45 percent of clinical documentation has missing or erroneous information.[10]

When used in thoughtful, meaningful ways, technology can help teams to address core clinical, financial, and operational challenges. Rather than looking at technology as something that an organization "has to do" to keep up, technology becomes meaningful when it becomes a valued member of the treatment team. The use of augmented intelligence helps to unlock cutting-edge applications within electronic health records (EHRs), connect data like never before to assist with managing the health of populations, and streamline backend administration and operations, which helps to engage and retain staff. When technology operates as a member of an organization's care team, it takes some of the drudgery out of operations so that providers gain back time to care for others. The "care" remains in "healthcare," as physicians always make the final call about diagnoses and treatment plans.

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Technology can also help to address critical shortages in mental health services. The need for counseling and other behavioral health treatments has escalated following the COVID-19 pandemic, which saw a 27 percent increase in the number of adults experiencing anxiety or depression.[11] Among youth, the problem is even more acute. In October 2021, the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, and the Children's Hospital Association declared child and adolescent mental health a national emergency.[12] From 2019–2021, emergency department visits for suicide attempts increased 51 percent for adolescent girls and 4 percent for adolescent boys.[13]

[6] https://aws.amazon.com/blogs/publicsector/forrester-study-examines-data-integration-roi-for-public-sector-organizations
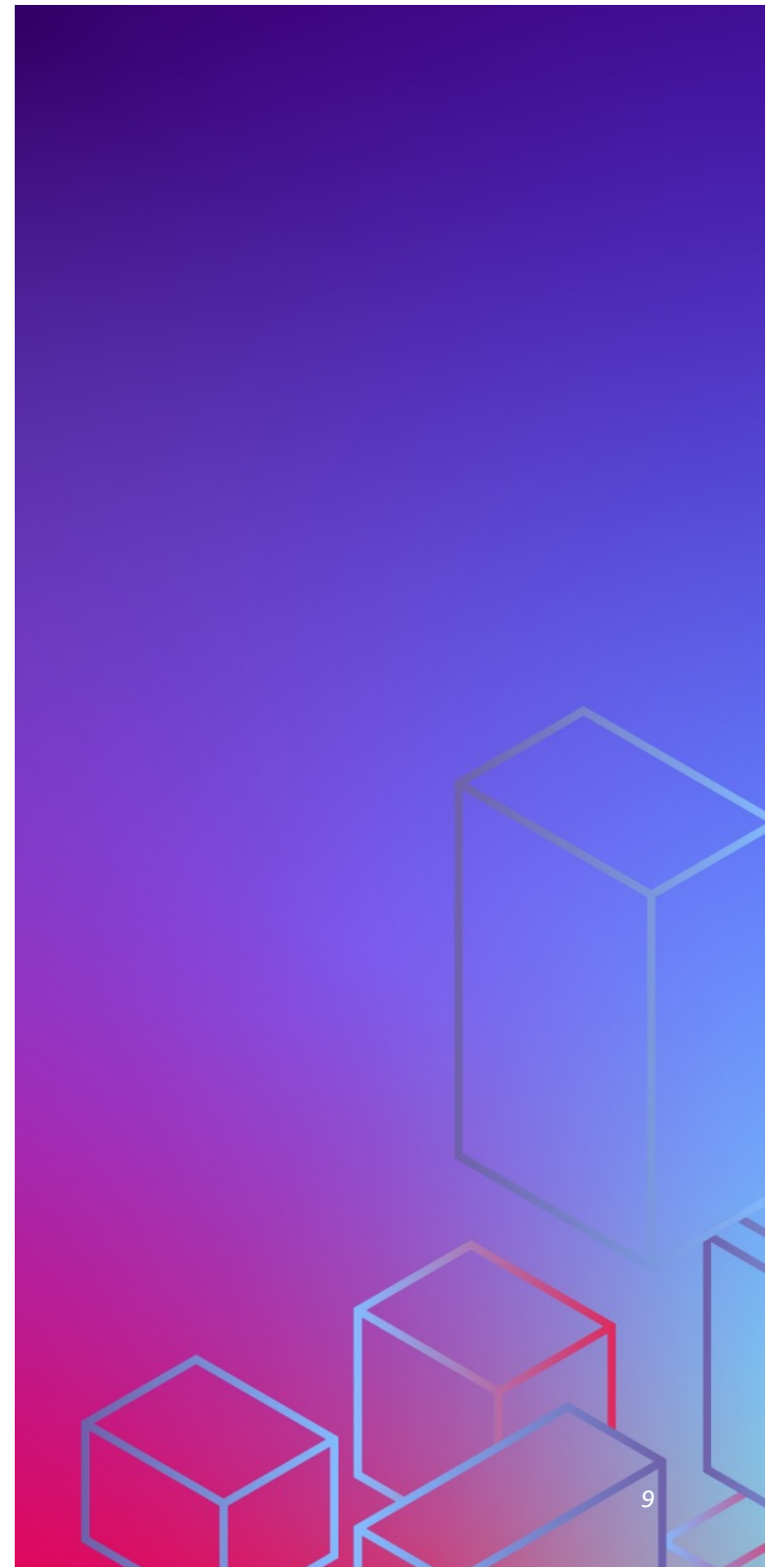
[7] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10148308/

[8] https://www.acpjournals.org/doi/10.7326/M18-1422

[9] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7083584/

[10] Mental Health America of South Central Kansas, Client Data.

[11] tps://www.thenationshealth.org/content/51/10/1.3

[12] https://www.aap.org/en/advocacy/child-and-adolescent-healthy-mental-development/aap-aacap-cha-declaration-of-a-national-emergency-in-child-and-adolescent-mental-health

[13] https://www.aamcresearchinstitute.org/our-work/issue-brief/exploring-barriers-mental-health-care-us

Using a collaborative framework for success

*Within and beyond clinical applications, organizations find value through the use of a shared framework to implement technology. Collaboration helps to prioritize resources and use cases, deliver value to individuals and providers, and drive adoption so that entire populations benefit. As a healthcare technology company, Netsmart has built its technological foundation using a variety of services from Amazon Web Services (AWS). The foundation of the collaboration lies on a shared culture of laser focus on meaningful results, working closely with clients to build meaningful solutions. Netsmart is continuously looking at ways technology is evolving, to identify the opportunities to introduce innovation as a scalable asset that organizations can use. AWS has built in **important safeguards for strong governance and the maintenance of data privacy and security.***

Perhaps it seems like a paradox, but technology can help to humanize the individual and clinician experience. Insights at the point of care contribute to the specific treatment plan so that clinicians focus on the person they're with rather than having to hunt for information or compile new facts to assist with a diagnosis. Augmented intelligence tools simplify the user experience and support clinical, operational, and financial workflows across all healthcare roles.

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To facilitate this transformation, Netsmart and AWS together developed an AI Data Lab, guided by the 4D Framework. The 4D Framework—define, design, deploy, and determine—supports organizations in experimenting with AI and implementing data-driven solutions effectively. By co-developing with client organizations and focusing on real-world challenges, the AI Data Lab ensures that innovations not only are practical but also enhance care delivery, efficiency, and outcomes. The framework provides a map for the diverse set of organizations that make up a community-based care team—often spanning from government-funded, government-operated, nonprofit, and for-profit organizations—all of which are dedicated to supporting better health and wellbeing.

In short, meaningful AI has the ability to empower people, especially within a well-defined framework and alongside partners for innovation. While respecting ethical considerations and data privacy, cutting-edge solutions enhance how the clinician of today provides care. We are witnessing a huge transformation in healthcare, when humans and machines work together in shaping the future of the human condition.

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Power of data: The AI data lab

For decades, healthcare technology has focused on the collection of information and digitization of healthcare records. In fact, by 2025, the total amount of global healthcare data is expected to reach 10,800 exabytes, representing an annual growth rate of 36 percent.[13] Digitization serves as the foundation for organizations to build solutions that benefit from AI and other emerging technologies. The ability to use data in decision-making is fundamentally changing healthcare: in clinical, financial, and operational processes. For the first time, technology is less about what people do for systems and more about what systems are doing for people.

As an industry leader in EHRs for human services and post-acute care, Netsmart has joined forces with AWS to develop the AI Data Lab. The AI Data Lab advances the use of AI for community-based care providers, helping to accelerate the delivery of knowhow at scale. Community-based care includes a wide array of organization that include state-operated hospitals, nonprofit clinics that rely on federal funding, and mission-driven companies that are focused on the healthcare and social supports that people need to meet their care goals.

Netsmart and AWS share the philosophy that all technologies are best when codeveloped with providers and the organizations that ultimately will use them. Netsmart clients collaborate with teams from Netsmart and AWS iteratively in real time to produce better solutions faster. This joint approach addresses specific challenges in the industry so that data-driven solutions immediately improve outcomes for individuals, alleviate the burden on front-line providers, and save valuable time for clinical, financial, and operational staff.

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While Netsmart contributes industry-specific expertise in healthcare technology and EHRs, AWS brings ideas and use cases from other industries that help the collaborative teams to think outside the box when building technological solutions for healthcare.

Together, Netsmart and AWS have built a complete data pipeline to serve as the foundation for Netsmart healthcare technology solutions built on a robust AWS infrastructure. Powerful AWS compute structures, which are purpose-built to power generative AI and ML, drive the data pipeline and facilitate Netsmart's ability to experiment at scale.

Built on cutting-edge technologies such as Amazon SageMaker, ML models power predictive analytics that help providers determine an individual's risk—for suicide, for hospitalization, for hospice, or for other acute interventions. Netsmart generative AI applications built on AWS help clinicians and back-office staff work more efficiently and ultimately improve outcomes. For example, generative AI can assist with individual-provider interactions by taking notes, summarizing visits, and writing reports.

[13] https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion

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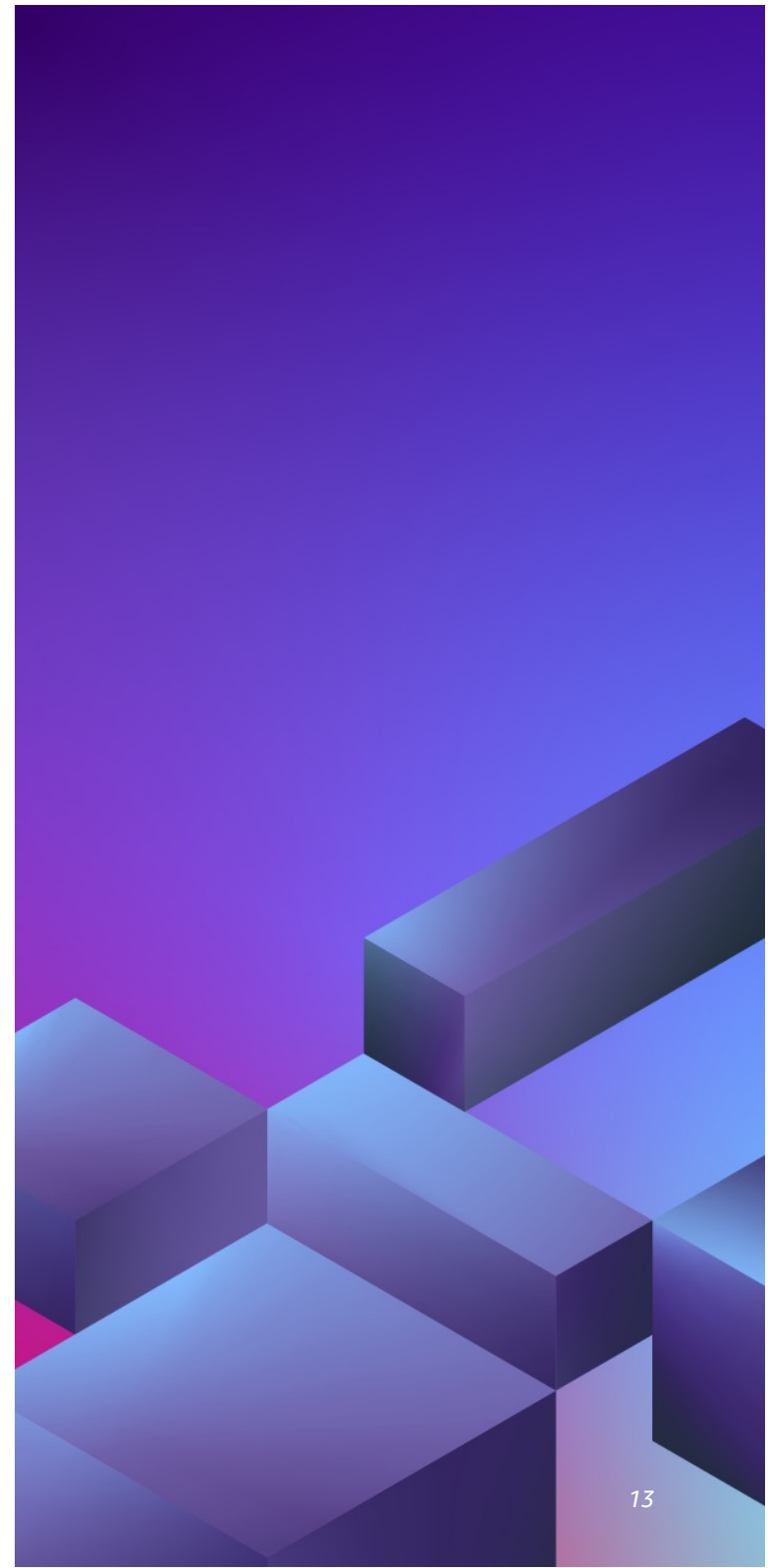
ML models within the AI Data Lab train on large, diverse data sets that account for a range of race, ethnicity, gender, age, and other demographics so that they can guard against bias. The AI Data Lab isolates sensitive data used to train models from the production side, maintaining the highest standards of security and data privacy by using publicly available data as well as data that an organization has consented to make available. Additionally, the AI Data Lab builds full model transparency into its solutions so that providers understand why AI systems produce specific results and the data that is driving the logic. AWS services provide robust, transparent auditability that contributes to a well-governed and secure ML environment. Diligent testing of solutions built on AWS generative AI services such as Amazon Bedrock protect against hallucinations, when an LLM produces an inaccurate result. In fact, Amazon Bedrock features built-in guardrails for responsible AI policies, bringing a consistent level of AI safety across a variety of applications.

Solutions built on statistical and rule-based AI as well as generative AI are evolving at astounding speed. Organizations that harness this pace of innovation can enhance their teams' human capabilities, using data to drive innovative AI-driven solutions that deliver differentiated value to ultimately improve care.

Implementation of AI: The 4D framework

The implementation of technology goes beyond just one department or one team. For technology to be truly transformational, all stakeholders within an organization need to be represented so that everyone has a role and opportunity to engage. Using lessons learned and approaches that have been tested in the AI Data Lab in collaboration with AWS, Netsmart offers a [4D Playbook](#) to help navigate this new era of healthcare technology. It includes a four-step framework for thinking about the implementation of AI. Meaningful AI strengthens an organization and the communities it serves.

Netsmart works side-by-side with clients and AWS, using the 4D Framework to solve real-world problems and find opportunities to improve workflows. The 4D Framework guides the collaborative effort toward the best possible solution from its inception through development.

Define

All too often, organizations tend to look to technology as a tool to solve an immediate problem without thinking about overall strategy, as a quick fix that the team has to learn to implement. Instead, a clear definition of challenges and opportunities establishes meaningful goals, providing a North Star for an organization as it implements new technologies at scale. For example, the [California Community Assistance Recovery and Empowerment (CARE) Court](#) needed a way to channel individuals living with untreated mental health and substance use disorders from the streets toward the care they need. Individuals' EHRs, social services, and legal records existed in silos, and the CARE Court wanted a unified view to better support individual needs.

Design

With its specific goals in mind, the CARE Court worked alongside Netsmart to design a way to develop an innovative AI-based solution that could provide a unified view of diverse datasets and create real-time reporting with critical metrics. Powerful technological tools automate caseloads, tasks, and workflows, alleviating much of the provider's burden. Development—including the choice of which AI services are the best fit—occurs within the context of technology's meaning for users.

Deploy

A phased approach to deployment helps to promote smooth implementation of technological tools. Instead of trying to introduce a perfect tool from day one, organizations can support adoption built on modest successes along the way. By starting small and iterating forward, teams become accustomed to working alongside AI as a partner. For example, the [Missouri Behavioral Health Council](#) (MBHC) implemented the Netsmart population health management platform to provide care coordination, interoperability, analytics, outcomes, and risk stratification to eliminate manual tasks, improve the delivery of care, and reduce costs. It eventually rolled out the platform across its 33 member agencies.

Determine

The implementation of Netsmart's population health management platform has given MBHC a way to set benchmarks, measure success, and ultimately improve outcomes. In short, implementation of technology is not a goal unto itself. After organizations deploy technological tools, the final step is to determine if they accomplished what they set out to do. In 2022, MBHC saw 14 percent lower hospital cost and a 16 percent reduction in visits to the emergency room. It increased overall access to care by 35 percent, with a 156 percent increase in medication-assisted treatment. Tangible measurements help to build confidence within the team and keep organizations on course to meet their goals. Meaningful AI is more than answering the question: "Did the organization implement this application?" It's about achievement: saving time, cutting cost, enhancing decision-making, and improving care.

The collaboration among Netsmart, provider organizations, and AWS within the 4D Framework helps to drive innovation and deliver net new technology that better serves communities. This shared vision is the ultimate goal that drives all implementation. As a step further, Netsmart and AWS work together to make technology simple and usable. That way, technology empowers providers and back-office staff so that they can spend more time on individual care or strategic tasks.

Humanizing Augmented Intelligence: Front end and back end

Technology is only powerful when people can use it simply and effectively. If solutions built on generative AI are to work as members of the healthcare team, the staff has to be confident and comfortable working side-by-side alongside them to achieve great care outcomes. That's why Netsmart and its edge partners have been working closely alongside AWS to contribute to the expansion of the Netsmart family of persona-based augmented intelligence solutions.

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Meet Bells AI: Digital Assistant and Virtual Scribe

Clinical

Imagine an assistant with instant access to information from millions of clinical visits across a diverse, global population. As the provider-individual interaction occurs, the assistant prompts providers with insights into goals and interventions to round out a personalized treatment plan for the individual in real time.

Bells AI from Netsmart is an AI-powered virtual assistant for the EHR. She behaves as part of the clinical team, providing data-driven decision making and insights at the point of care from the narrative side.

Bells AI helps boost the efficiency of clinical teams through faster and more accurate notes, fewer rejected claims, and better retention and recruitment. For example, Bells AI can help improve average note writing speed by 67 percent and on average gains 84 percent of time back for teams from session to sign. For back-office operations, the use of Bells AI can lead to more than 2.2. days faster reimbursement and an average increase of 16 percent improvement per provider in claims submission and acceptance.

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Most important, Bells can save providers on average 50 percent of their time so they can focus on individuals. She also can facilitate faster onboarding, improves staff retention and recruitment, and creates more access to care.

"We decided to invest in Bells AI to help our staff with the part of their job they least like, which is clinical documentation. We knew investing in the technology would improve morale, their ability to work with consumers, and complete their work more efficiently." —Mary Jones, CEO of Mental Health America of South Central Kansas.

Bells AI also can serve as a digital scribe. As she incorporates groundbreaking solutions in generative AI such as Amazon HealthScribe, she will automatically create clinical notes from individual-clinician conversations. Bells' scribe capabilities rely on ambient technology to transcribe conversations, generate notes, and let providers edit in real time. The clinician of the future focuses 100 percent on the individual while the Bells AI Digital Assistant handles note-taking and cumbersome documentation.

Meet Benny: Digital Collections Assistant

Financial

Benny is another member of Netsmart's augmented intelligence family, taking over manual tasks that often may overwhelm back-office staff. He helps to improve management of accounts receivable, guides collectors through suggested workflows, and redirects back-office staff to more strategic work.

As a digital collections expert, Benny can help back-office teams to optimize operations. His denials expertise assists organizations in meeting their financial goals by suggesting best practice workflows that help staff to collect cash quickly. He answers complex billing questions with an automated pop-up window that guides staff to the most efficient workflow, based on best practices that are customized to a specific organization.

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Benny uses cloud-based automation to help collectors work the right claim at the right time, boost collection rates, and tackle accounts receivable. He handles a comprehensive list of common denial code groupings, such as:

- *Eligibility*
- *Noncovered services*
- *Authorizations*
- *Appeals*
- *Coordination of benefits (COB)*
- *No claim on file*
- *Missing/incomplete/invalid information*
- *Missing/invalid modifiers*
- *Timely filing*

By offloading mundane tasks to Benny, an organization's back office moves from pushing buttons to taking on more interesting, strategic work. The staff is happier and more engaged, supporting the organization's overall financial health.

Meet Otto: Virtual Support Assistant

Operational

Otto serves as a virtual support assistant, facilitating case management by providing dynamic organization based on the respective stages of cases. He aids productivity across an organization, providing a "to do" list for cases that need attention. The list indicates which cases need additional troubleshooting, uses comments to designate a case as "open" and remove it from the list, and adds new pending cases.

Otto's simple interface also provides one-click access to active cases, case creation capabilities, and recently resolved cases. Staff navigate to the cases they wish to see and can view cases by stage or create a case for a quick question or request.

Organizations work with Otto to efficiently access support cases through simple interactions. Through the simplified case creation feature, staff can engage support quickly. In fact, Otto has helped organizations to reduce case management by 60 percent and save valuable time for staff.

Otto can help staff search for knowledge, whether looking up the status of known issues or finding product answers quickly from all Netsmart resources. Additionally, employees will be able to chat with Otto, asking questions and interacting with him using natural language.

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Conclusion: The future of AI in healthcare

In the clinic of the future, reporting vanishes. Providers ask a question in natural language and immediately receive the answers they need. Automated, streamlined operations free personnel to focus on what really matters: serving people.

Individuals don't have to ask for a second opinion—they get a well-defined set of options based on their clinical condition and circumstances in near real time. Providers create ultrapersonalized, proactive plans of care for the people they serve. Instead of looking at an individual's private data in a silo, AI helps providers to automatically integrate context from research, community, and public databases.

Healthcare technology has moved beyond simply digitizing information that recreates the analog world. Augmented intelligence combines data in intuitive ways that drive insights at the point of care. Human-centric AI personas work alongside providers, using powerful computing capabilities to synthesize massive amounts of data from EHRs, public and community health systems, and medical research.

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Historically, EHRs have been episode driven, the result of a need for acute care. As healthcare launches its next chapter, solutions of the future are using AI to become increasingly effective at incorporating context to enhance an individual's plan of care. A person's vocation, housing, and community are as instrumental to their wellbeing as any other care a clinician may provide.

In fact, AI is helping to improve care not only for individuals but also entire communities. Technology-based solutions have already seen great success in improving public health by connecting disparate data sources and driving powerful insights.

Just like the copilot in a car, human-machine collaboration drives better outcomes. Meaningful AI is never about removing the human being from the equation. Rather, the future of meaningful AI in healthcare is about putting the human at the center point. Technology and humans work side by side so that healthcare of the future is more informed, more empowered, and ultimately more human.

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