

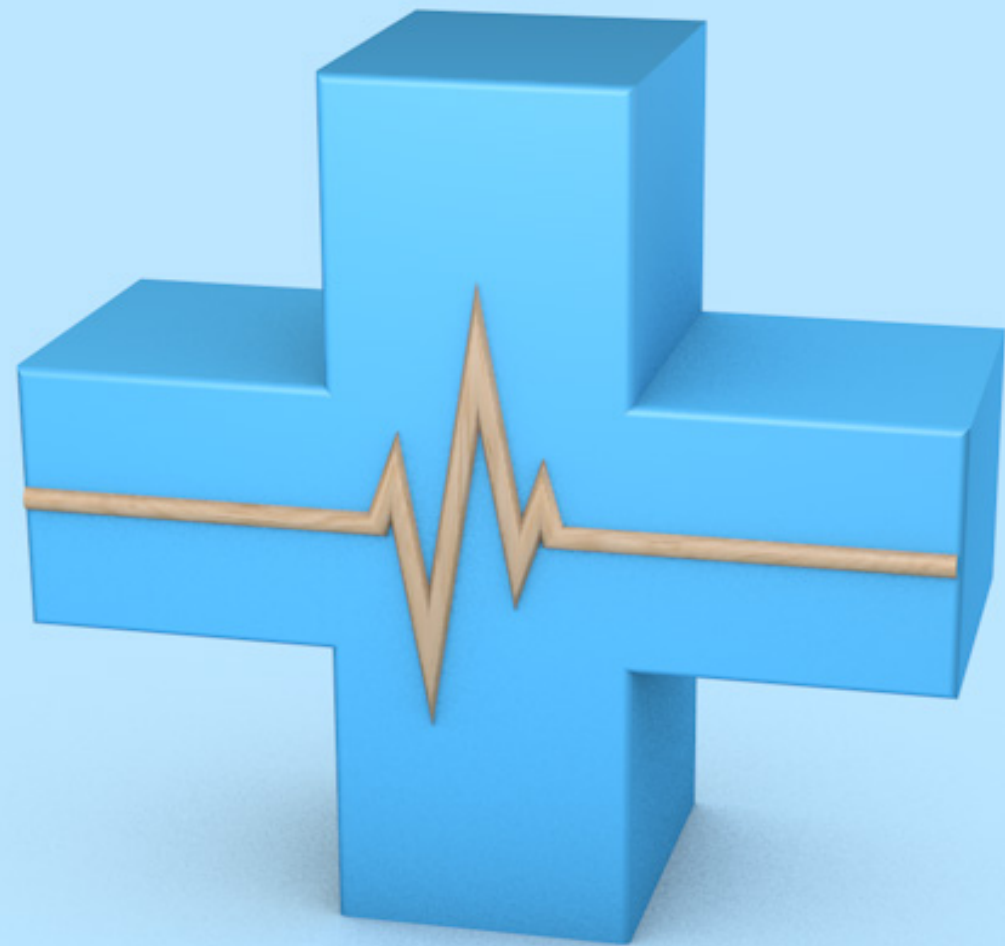
E-BOOK

Your prescription for AI success

Build a data infrastructure to enable artificial
intelligence in medicine

 **NetApp**





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Can AI save medicine?

Healthcare costs are rising. Physicians, nurses, and administrators are burning out. And data privacy and security are more important than ever.

Lucky for you, the doctor is in. The cure is artificial intelligence. Artificial intelligence (AI) is enhancing medicine, driving transformation in just about every aspect of the industry.

From automating mundane administration tasks to enabling faster and more accurate patient diagnoses to fast-tracking drug development, AI is at the heart of it all.

The opportunities are endless. But building an AI infrastructure—especially in a highly regulated medical environment—isn't easy.

You need a data infrastructure that can unleash the power of AI throughout your organization.

Up to
30%

of healthcare expenditures are wasted globally. AI can help minimize waste by enabling more efficient care delivery.¹

How healthcare executives plan to use AI



37%

Assigning codes for accurate diagnosis and reimbursement.²



40%

Monitoring data from Internet of Things devices such as wearable technology.²



37%

Accelerating research for new therapeutic or clinical discoveries.²



The future of medicine is here

The pandemic has accelerated digital transformation for businesses in every industry—especially in medicine, where the use of AI has pushed virtual care and vaccine development to the front of the line.

- In 2021, the use of virtual care is **38 times higher** than before the COVID-19 pandemic.³ To enhance virtual patient care, clinicians rely on AI to help them make accurate diagnoses and to enable remote monitoring of elderly patients and those with chronic illnesses.
- To beat the clock against future COVID-19 mutations, researchers at the University of Southern California developed a machine learning (ML) model that creates **vaccine design cycles in just seconds**, instead of months or years.³

As medicine continues to evolve, patients, clinicians, and researchers are relying more and more on AI to automate administrative tasks, streamline diagnosis, fast-track treatment research, predict risks, and manage public health.



Virtual nursing assistants

Chatbots, voice assistants, and even animated avatars help nurses communicate information to patients quickly—when and where they need it. AI can also act as a second set of eyes, verifying the work of nurses, doctors, and pharmacists to make sure that prescriptions are accurate and safe.



Medical imaging

Advances in medical imaging technologies, including 3D and 4D capabilities, real-time analytics, and GPU-accelerated processing, give radiologists powerful tools to make faster and more accurate diagnoses and recommendations for care.



Genomics

AI software can help identify patterns among the human genome's more than 3 billion base pairs. In the process, it identifies individual mutations. Then, based on experience, it makes predictions and recommendations for the best course of treatment.



Remote monitoring

Use of AI-driven remote monitoring devices helps patients with chronic illnesses such as diabetes and heart disease stay closely connected to their physician, without having to step foot in the clinic. Doctors can act instantly when a risk is detected, keeping issues from turning into life-threatening complications.



Data security

ML applications can track access to patient records in a hospital and assess whether that access is appropriate—or suspicious.

Automate administrative tasks

Did you know that one out of every three dollars spent in the medical industry is for administrative costs alone?⁴ You do now.

40% of tasks performed by healthcare support staff and 33% of tasks performed by healthcare practitioners have the potential to be automated by AI.⁵ Automation can include scheduling appointments, inputting data into the electronic health record (EHR), and managing paperwork.

Scheduling appointments is time consuming, taking an average of 8 minutes per call.⁶ Self-scheduling technology based on AI offers 24/7 access and automatic reminders. And if a patient cancels their appointment, people on a waitlist are automatically notified of the opening. This automatic notification frees up front desk staff while also avoiding no-show appointments.

Doctors report that for every half hour they spend with a patient, 60% of the time is spent inputting and searching for data in the patient's EHR.⁷ AI-enabled natural language processing software integrated with EHR systems can help clinicians spend more time with patients and less time at a computer.

Over 80% of medical bills contain errors, resulting in stalled payments, patients being overcharged, and fraud.⁸ With an automated denials management system, AI can quickly identify where the problem is and resubmit the claim—without any human intervention needed.



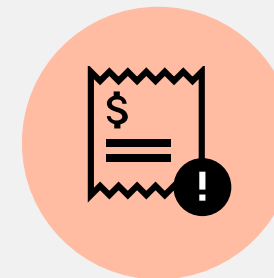
Patient self-scheduling can **free up one full-time equivalent** for every 100 appointments that would have been scheduled by phone.⁵



Using automation to eliminate scheduling inefficiencies can save up to **\$140 billion** per year.⁹



79% of physicians say that paperwork and administrative burdens are the top issue that is ruining medicine.¹⁰



Billing mistakes cost hospitals **\$68 billion** per year.¹¹

Streamline diagnosis

Over in diagnostics, AI-based neural networks are accelerating diagnoses—even detecting signs of diseases such as lung cancer earlier and faster to help radiologists be more efficient.¹²

Many cancers start with changes so small that no human could detect them—even with current medical imaging technology. AI programs armed with deep learning, however, can be “trained” to see the earliest changes in cell structure that typically lead to the development of cancerous cells. These programs alert oncologists to help them guide patient care protocols with greater accuracy and effectiveness.

AI algorithms can scan and analyze biopsy images and MRI scans 1,000 times faster than doctors and can diagnose with an 87% accuracy rate.¹³

Non-emergency CT scans might not be read by a radiologist for up to 72 hours. With AI, a machine can read and triage images, flagging urgent conditions for immediate attention. This use of AI can take diagnosis time from 3 days to 30 minutes—and could mean the difference between life and death.¹⁴

King's College London uses AI to transform clinical care for 8 million patients

King's College London is a public research university. It is a worldwide leader in medical research and was the first clinical provider in Europe to adopt AI with the purpose of rethinking the practice of radiology.

King's College London built an AI platform that allows specialists in the United Kingdom's National Health Service to automate radiology interpretation. With a shortage of radiologists in the United Kingdom, patient diagnoses were backlogged due to unread studies. This solution speeds up the diagnosis process and enables providers to deliver personalized medicine to their patients.



Fast-track treatment research

With the help of AI, researchers can work quickly to develop drugs and treatments that more effectively target specific diseases. From transforming disease identification to discovering how to prevent and treat diseases, AI plays a key role in improving the lives of billions of people.



Drug and vaccine development

AI has the potential to offer \$70 billion in savings for the drug discovery process by 2028.¹⁵ With AI, huge datasets can be analyzed quickly and hidden insights easily extracted—both tasks that would be nearly impossible for individual researchers to accomplish. AI helps predict the appropriate chemical compound properties for a drug, saving researchers trial and error time, and enabling a more effective drug. Overall, AI can save hundreds of person hours in a laboratory, resulting in an accelerated drug discovery pipeline.¹⁵



Genomics

Not only is sequencing the human genome incredible science It's a game changer when it comes to finding treatments for critical illnesses, extending life, and even eradicating fatal conditions entirely. AI has the power to look deep into genomic data and identify biomarkers that escape the human eye. AI helps healthcare providers understand how to identify diseases in their earliest stages. It also helps researchers learn more about the diseases so that they can develop more effective drug and therapy treatments.

Predict risks and manage population health

No one can see the future. But with AI, we can come darn close.

Using AI, physicians can anticipate what will happen, when it will happen, and why it will happen. In a nutshell, AI gives providers the tools and information they need to identify high-risk patients before their conditions evolve into costly, life-threatening situations.

Even for patients without obvious symptoms, AI can identify information that predicts a patient's risk for developing a disease such as diabetes or lung cancer in the future.

AI can also help physicians provide better care to hospitalized patients by predicting their risk for life-threatening complications such as pneumonia or sepsis. Healthcare can use AI to help predict infectious diseases and epidemics before they begin by using data such as population density, economic profiles, reported cases, and weather. Predictions like this were not even possible to think about until now.

Patient self-management

In addition to predicting risks for patients in the hospital, AI can also be used to prevent patients from needing to come to the hospital in the first place.

By providing remote monitoring devices to patients with heart failure and diabetes, providers can predict when a patient is at risk of ending back up in the hospital. Providers can intervene before something happens.

A remote device monitors a patient's symptoms, blood pressure, weight, and oxygen levels from home. If a risk is detected, the physician is contacted.

In a study of 1,100 patients, remote monitoring dropped the rate of hospitalization by

76%¹⁶



Three keys to AI success

AI is likely to play a major role in medicine soon. But many approaches to AI involve architectures that silo analytics, training, and inference workloads. These silos create unnecessary complexity, drive up costs, and make it hard to scale. Here are three keys to building an AI infrastructure that advances patient care and improves operational efficiency.

1 Vast amounts of data

Data is key to identifying patterns, developing predictive insights, and enabling increasingly accurate autonomous systems. Typically, the more data, the more accurate the model. In medicine, there's no shortage of data. But more data usually means larger AI models—some with millions or billions of parameters. Training models of this size can take weeks of compute time and require the best-of-the-best machine learning and deep learning frameworks.

Not only does all of this data need to be managed, it also needs to be protected within the strict parameters of internal and external compliance regulations.

2 Seamless data movement

Volumes of data are massive and stored in many different forms. And that data lives everywhere—across multiple clouds and in the data center. Data silos and technology complexity are major hurdles to getting AI projects into production.

In a modern AI infrastructure, thousands of edge locations gather terabytes of data every day. Effective AI requires a data pipeline that spans the entire ecosystem, from ingest and data preparation all the way to analysis and tiering. Data must be able to flow quickly and freely throughout the pipeline at every step. Deep learning only scratches the surface if access to this data is limited by a siloed infrastructure.

3 Speed

AI infrastructures must be able to respond in a heartbeat. For applications such as virtual nursing assistants or self-scheduling that use natural language processing (NLP) technology to ingest, process, and respond in a humanlike way, speed counts. It's important that there is no detectable lag in the AI's response.

Likewise, remote monitoring devices and AI intervention techniques that help guide critical care treatment require instant response times. When lives are on the line, there's no time to wait for the computer to respond.



Artificial intelligence meets the Quadruple Aim

The pressure is on to enhance patient experience, improve population health, and better the work life of healthcare providers—all while reducing costs. Data is key to hitting your Quadruple Aim targets.

NetApp helps make sure that your data is always available in the right place at the right time to fuel transformation. We remove data silos to give you real-time diagnosis, accelerate time to market for new drug treatments, and help you streamline administration with proven AI solutions. And as the data authority on hybrid cloud, NetApp delivers AI solutions that remove bottlenecks at the edge, core, and cloud to enable more efficient data collection, accelerated AI workloads, and smoother cloud integration.

NetApp® AI solutions:

- Leverage API integrations with Python, Jupyter, Kubeflow, and other data science environments to make it easy for developers to create standardized, repeatable processes for more accurate experimentation.
- Support seamless, cost-effective data movement across a unified hybrid multicloud environment.
- Integrate with AI leaders, channel partners, systems integrators, software and hardware providers, and cloud partners to deliver smart, powerful, trusted AI solutions that help achieve your business goals.

NetApp is positioned as a leader in AI, winning [multiple awards and industry recognition](#).



Make your data scientists happy

5x

Run five times more data through your pipeline.

<60
seconds

Copy datasets in seconds rather than hours or days.

~20
minutes

Configure your AI infrastructure with Ansible integration.

Samsung SDSA streamline data preparation for medical imaging AI

Training AI models on medical images and video data requires significant pre-processing and human annotation. Hear from Samsung how the right toolsets can dramatically reduce that effort.

[Watch the video](#)

Yale New Haven Health evolves its computational health platform

Yale New Haven Health has been at the forefront of precision health by using Hadoop integrated with NVIDIA DGX servers. Learn about their evolution to a next-generation platform predicated on a unified data lake, Kubernetes, AI, and readiness for the cloud.

[Watch the video](#)



Start your journey today

Are you ready to start revolutionizing medicine?
Learn more about NetApp's solutions for AI:

- [NetApp AI](#)
- [NetApp ONTAP AI](#)
- [NVIDIA Base Command Platform with NetApp](#)
- [NetApp AI solutions for medicine](#)
- [NetApp solutions for natural language processing](#)
- [NetApp solutions for computer vision](#)

Questions? Our [AI solution specialists](#) are standing by.



About NetApp

In a world full of generalists, NetApp is a specialist. We're focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world's biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services, and applications to the right people—anytime, anywhere.

To learn more, visit www.netapp.com

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