



Information Overload: Why Physicians Are Inundated With Data (And How to Manage It)



THE PLIGHT OF THE DIGITAL DOCTOR

On its face, it might look like technology has made the life of a doctor easier. Just over a decade ago, they were sorting through paper charts and documenting patient encounters by hand, carrying a plethora of mobile devices, and logging countless steps to consult with their colleagues.

Today, the patient record is electronic, most physicians now carry a single smartphone, and technology often facilitates care team collaboration.

But things haven't been simplified for physicians at all. On the contrary, they're inundated with more data than ever before, grappling with an explosion of information every day.

A DAY IN THE LIFE OF A PHYSICIAN

Physicians today not only are expected to provide exceptional patient care, but also to keep their patients out of the hospital, advance the overall wellness of their communities, and stay abreast of advances in research, all in an industry with ever-evolving regulatory and payment structures. The incredible potential of the EHR to store countless data has exacerbated the administrative burden, leading to many doctors using their "time off" catching up with paperwork (not so affectionately called "pajama time" by some).¹

Not only do their peers and patients constantly require their attention, but so do systems. A 2016 JAMA study found that [primary care physicians spend over an hour \(66.8 minutes\) each day simply processing notifications](#). And because each notification often contains multiple data points (for example, the results from a lab panel may contain over a dozen values), the actual cognitive effort placed on the physician is even greater.²

So, who wants to be a doctor? With a job description like this and mounting medical student loan debt, it's no wonder our country is facing a [shortage of 120,000 physicians by 2030](#).³

A photograph of a doctor in a white lab coat, seen from the chest up, holding a tablet computer. The doctor's right hand is pointing at the screen. A stethoscope is visible around the doctor's neck. The background is a blurred clinical setting with a laptop and other medical equipment.

“ *We rely on it so much that we consider the EHR to be a team member. But in fast-paced critical care units, where even small errors can have big consequences, this digital team member can overload physicians with information.* **”**

– Mayo Clinic researchers⁴

COGNITIVE LOAD THEORY AND PATIENT IMPACT

Despite the growing complexity of care delivery, the human ability to process massive amounts of information has remained constant. A recent [NEJM Catalyst article](#)⁵ breaks down cognitive load theory, or the factors that influence how much working memory is occupied, and its implications for healthcare:

Intrinsic cognitive load: The cognitive “weight” of the information or task, determined by the complexity of the material being processed, and this is fixed. NEJM used the example of a more difficult case or a very complicated procedure that has a higher intrinsic load than a more straightforward case or procedure.

Extraneous cognitive load: The mental load imposed by the organization of information or a task. Another example from NEJM: A poorly organized unit, where one must go to multiple locations to acquire the requisite materials for a procedure, imposes unnecessary extraneous load. “When extraneous load increases, it steals limited working memory, reducing humans’ ability to attend to complex information.”

Why does an overwhelming cognitive load burden on physicians matter?

For starters and perhaps most obviously, the amount of information physicians must process is a primary contributor to burnout. Factors cited by physicians, according to the [latest comprehensive survey by Medscape](#), include too many bureaucratic tasks (56 percent), spending too many hours at work (39 percent), increasing computerization of practice (24 percent), and feeling like a cog in a wheel (20 percent).⁶

Not only does the information overload adversely affect the physician experience, a massive problem unto itself ([physician burnout has even been called a public health crisis](#)⁷ by administrators at leading hospitals), but it also affects patient care. [Clinicians ignore safety notifications](#)⁸ more than half of the time (49-96 percent) according to Shobha Phansalkar, an assistant professor of medicine at Harvard Medical School. “When providers are bombarded with warnings, they will predictably miss important things,” David Bates, chief of the Division of General Internal Medicine and Primary Care, Brigham and Women’s Hospital in Boston and professor of medicine at Harvard, also told the Washington Post.⁹

Another study published in the Journal of the American Board of Family Medicine stated that [errors related to information handling](#)¹⁰ account for 29 percent of family medicine errors: “Without information that is comprehensive, accessible, timely, and correct, primary care physicians cannot deliver high-quality care.”

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– David Bates, Chief of the Division of General Internal Medicine and Primary Care Brigham and Women’s Hospital, Boston¹¹

HOW TECHNOLOGY CAN HELP PHYSICIANS MANAGE INFORMATION

Care certainly won't get less complex, and available information will only continue to grow exponentially, so what can hospital leaders do to lessen the cognitive load on their physicians? The key is to find and deliver the information that truly matters.

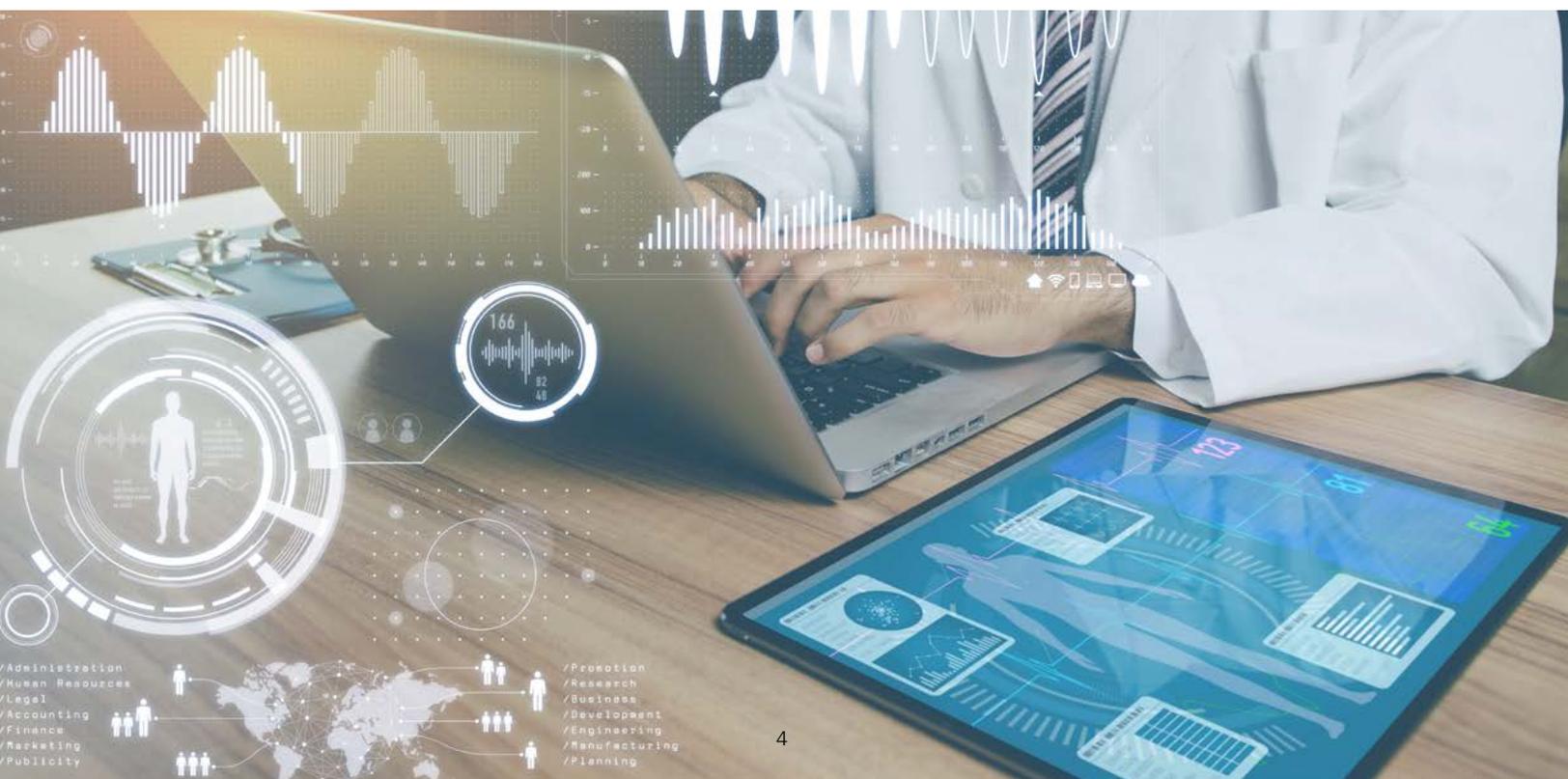
Consider the sheer volume of data in EHRs: Individual physicians must sift through more than 50,000 data points to find key information, or to find meaning in the noise. [Mayo Clinic conducted 1,500 interviews with clinicians](#)¹² in its own ICUs nationwide to identify how many pieces of the tens of thousands were actually "crucial patient information that clinicians needed to access quickly and easily for effective care." The answer? Roughly 60 pieces of information that truly mattered, or about 0.1 percent of the data available.

How do you get this information—data points that actually help them make more informed care decisions—to physicians when they need it? Clinical communication technology is key to providing clinically relevant and actionable information to physicians, and suppressing the information they don't need to sift through.

“ *The volume of knowledge and capability increases faster than any individual can manage—and faster than our technologies can make manageable for us. We ultimately need systems that make the right care simpler for both patients and professionals, not more complicated.* **”**

– Dr. Atul Gawande

Surgeon, Public Health Researcher, and CEO, Health Venture
by Amazon, JPMorgan, and Berkshire Hathaway¹³



3 WAYS TECHNOLOGY CAN EASE PHYSICIANS' EXTRANEOUS COGNITIVE LOAD

1. A Single Source of Truth for Communications

A major source of extraneous cognitive load is the simple-sounding but often difficult to perform task of communicating with a colleague or care team member. Physicians initiate and receive communications day in and day out, and they waste a great deal of time and experience much frustration retrieving basic information, like their colleague currently on-call, or the phone number of the specialist they wish to consult with. Contact and scheduling details that physicians can trust to be current and correct and that they can quickly access helps reduce their extraneous cognitive load.

A [web-based, enterprise directory](#)¹⁴ that maintains contact information, schedules, and preferences—all of which can be updated in real time—ensures that physicians are finding the right colleague at the right time, even if they only know the role or simply want to reach whomever is on call. There's no wasted time and consequent dissatisfaction from searching for information from unreliable or out-of-date sources, or waiting on the availability of the operator to help: All of the data that supports seamless communication is literally right at physicians' fingertips.

By removing the extraneous cognitive load elements from clinical communication workflows, you empower your physicians to attend to more complex information, like reviewing the patient history and consulting medical reference applications and colleagues to diagnose a particularly challenging case. The value-add of this workflow is not searching for the information, but the quality of the information that supports meaningful communications.

PHYSICIANS' OVERWHELMING COGNITIVE LOAD: BY THE NUMBERS

66.8 minutes is the time primary care physicians spend simply processing notifications each day (JAMA)¹⁵

29% of family medicine errors are related to information handling (Journal of the American Board of Family Medicine)¹⁶

5-15% of alarms are clinically significant (Anesthesia & Analgesia)¹⁷

49-96% of clinicians ignore safety notifications (Harvard Medical School)¹⁸

50,000 data points are in the typical EHR system, which physicians must sift through (Mayo Clinic survey)¹⁹

60 pieces of information are in the EHR that physicians say truly matter (Mayo Clinic survey)²⁰

CASE STUDY: The Ottawa Hospital

"Spok is also helping us keep our employee contact information centralized and up to date. Now we're using Spok Mobile for our staff to easily communicate with one another on all the different devices they carry."²¹

2. Actionable Information With Clinical Context and Priority

One of the most lamentable things about physicians' cognitive load is how many notifications they must process that do not ultimately require any action from them. Instead of forcing caregivers to sort through the stream of notifications and search for the alerts that call for their attention and action, essentially like looking for a needle in a haystack umpteen times per day, technology can sift through it for them, identify the critical ones, and deliver those to the physicians. Additionally, technology can further limit disruption of physicians' workflows by including the relevant clinical context needed for them to make an informed decision from wherever they are at that time.

Clinical alarm surveillance can correlate and combine valid alarms²² from clinical systems and deliver the actionable alert to the right clinician's preferred mobile device. The technology recognizes patterns and can correlate patient data and alarms from multiple sources into one clinically relevant alarm, and importantly, suppress nuisance or non-actionable alarms. This technology prioritizes clinical alarms that require immediate attention (e.g., an elevated MEWS score that indicates a pattern of deterioration) to ensure clinicians remain uninterrupted for alarms that do not require intervention.

Advanced technology can also deliver real-time patient data that provide the relevant clinical context right into to physicians' hands in a secure message²³ on their mobile device, rather than forcing them to log into the EHR and search for it. This context may include real-time patient vitals, live waveforms, and recent patient history. This effectively creates a system of action that complements the system of record, the EHR, and enables caregivers to make accurate clinical decisions and act on them quickly.

Finally, it's critical that these notifications and messages aren't added to an overflowing EHR inbox or string of personal messages that can be difficult to sift through, especially when time is critical. A clinical communication platform with secure messaging makes these communications special and different from other information. Those critical communications filter into a separate, encrypted, priority inbox and can be further classified with color and audible tone to demand attention—even overriding a device's mute switch and "do not disturb" settings when necessary.

With clinical communication technology, physicians can effectively shift from searching through information to being proactively served the information that requires an immediate response, and not being needlessly interrupted with information that does not benefit from their intervention. This again reduces the extraneous cognitive load so they can focus on what matters most.

“Without information that is comprehensive, accessible, timely, and correct, primary care physicians cannot deliver high-quality care.”

– Journal of the American Board of Family Medicine²⁴

CASE STUDY: University of Utah Health

“Getting people to act faster has a huge amount of value, especially when you're talking about sepsis. We wanted to get providers to the bedside in minutes every single time that sepsis is recognized. We knew that making electronic communication more efficient was something Spok could help us with.”²⁵

3. Speed

Speed is also extremely important when it comes to responding to critical events. Clinical communication technology allows organizations to build out automated escalations to ensure a timely response. This could be at the device or role level. For example, Dr. Jones may receive the first message as a secure text on her smartphone. If she doesn't respond, that message is escalated to her pager. If there is still no acknowledgment, then that message is escalated to the role defined for backup—in this case, Dr. Smith, the on-call hospitalist.

These escalations further reduce cognitive burden by giving physicians the peace of mind that if they are unable to respond or miss something important, they have the safety net of having that patient alert automatically be delivered to another caregiver. Imagine the mental toil that is removed when a physician is currently addressing an urgent patient need when his phone goes off with a critical alert. With this technology, he can safely continue providing care to his current patient, confident that a colleague will receive and quickly respond to the alert he didn't acknowledge.

Speed is also about the time it takes to go from thought to task completion. In addition to the single source of truth to speed the time it takes to identify and communicate with the right provider, there are also tools to shorten the time it takes to compose and send the message. Many care team communications are routine, so a physician may find herself typing out the same reply over and over again. This creates tremendous cognitive burden, forcing her to recall the process she followed last time and manually repeat it. This process stymies efficiency for the physician, but also creates a domino effect that can slow down the entire care team. Message templates, defined by the organization, department, or user, allow clinicians to create a set of standard messages to respond in seconds to common messages, such as a patient discharge request, to help prevent breaks or bottlenecks in the workflow.

CASE STUDY: Banner Health

"As soon as the system detects changes in vital signs, it automatically sends an alert message, and if that caregiver cannot respond immediately, Spok handles the escalation by alerting the next-available clinician. We no longer need to physically monitor changes in vitals. The messaging is all automated."²⁶

CONCLUSION:

While technology won't fully ease physicians' intrinsic cognitive load, these types of technology solutions go a long way toward helping to alleviate the extraneous cognitive load. Imagine cutting the time spent updating schedules by 67 percent because every department and team is empowered to make real-time updates that any staff member can access. Or reducing the volume of code blues by 70 percent because clinical alarm surveillance delivers alerts that matter—when patient deterioration is detected. These are the **real results** that can be achieved with technology that delivers clinical information to physicians when and where it matters most.

Learn more: www.spok.com

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ABOUT SPOK, INC.

Spok, Inc., a wholly owned subsidiary of Spok Holdings, Inc. (NASDAQ: SPOK), headquartered in Springfield, Va., is proud to be a global leader in healthcare communications. We deliver clinical information to care teams when and where it matters most to improve patient outcomes. Top hospitals rely on the Spok Care Connect® platform to enhance workflows for clinicians, support administrative compliance, and provide a better experience for patients. Our customers send over 100 million messages each month through their Spok® solutions. When seconds count, count on Spok.

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