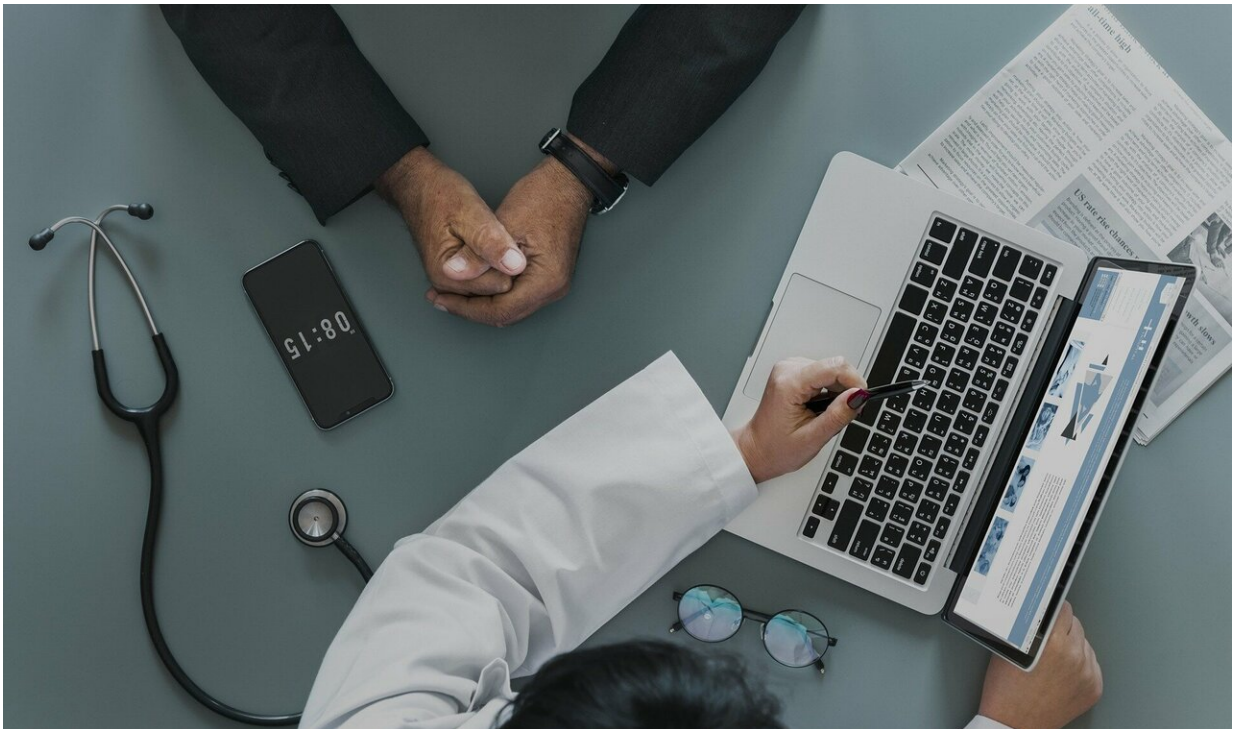# Primary care specialist discusses AI enhancing the human connection in medicine

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Artificial intelligence promises to transform medicine. It is already diagnosing cancers and arrhythmias, providing digital health coaching and predicting which patients are at the highest risk of heart failure. Soon, patients with common symptoms can expect to receive advice via AI, and physicians will likely use data from wearable devices to diagnose

or treat diseases.

But for all the benefits AI can provide, patients fear the specter of robots relaying dire prognoses, while physicians are wary of more technological burdens. Steven Lin, MD, clinical assistant professor of medicine and vice chief for technology innovation in Stanford's Division of Primary Care and Population Health, asserts that we need to implement AI wisely to avoid the downsides. Used right, AI can improve care, lower costs and reduce physician burnout, he said.

In an article published online May 15 in the *Journal of General Internal Medicine*, Lin outlines 10 ways AI can improve primary care without impeding the human touch. More than half of patient visits are made to a primary care doctor, he wrote, so most of the benefits of AI will be realized in the primary care space.

Recently, he discussed the promises and potential pitfalls of AI with science writer Mandy Erickson.

1. In what ways can AI help physician well-being?

Lin: Studies show that about half of all U.S. physicians are experiencing professional burnout. AI carries tremendous potential to improve physician well-being and reduce burnout. It can do so through a wide range of methods, but we believe there are three ways AI will have the most impact.

The first is clinical documentation. Today, for every hour physicians spend face to face with patients, they spend another two hours doing clerical work—most of which is spent writing notes. AI-powered digital scribes that can listen in on physician-patient conversations and automatically generate a clinical note can unshackle physicians from the electronic health record.

The second is the way it can adjust physicians' patient loads. AI algorithms can ensure that physicians have adequate time to address the needs of each patient by increasing or decreasing their patient load based on the complexity of the patients' conditions. Such models can also be used to determine the level of staffing support—medical assistants, nurses, advanced practice providers, clinical pharmacists, social workers—needed based on the intensity of care provided, which can contribute to better work-life balance for physicians.

The third is practice management. AI-driven tools can automate tasks such as pre-visit planning, insurance-eligibility checks, insurance claims, prior authorizations, appointment reminders, billing, coding, data reporting and analytics. Automating repetitive tasks that are suffocating physicians and their practices is one of the most anticipated applications of AI.

2. How can AI improve patient care?

Lin: There are myriad ways AI can improve patient care. In terms of risk prediction and intervention, AI-powered algorithms can now outperform traditional predictive models in estimating risk for dozens of acute and chronic conditions, which can be used to lower the number of preventable emergency room visits and hospitalizations.

In terms of medical advice and triage, many companies have developed "AI doctors" that provide health advice directly to patients with common symptoms—with diagnostic accuracy comparable to that of human doctors in some cases—which can free up primary care access for more complex care. In terms of population health management, AI can improve on current processes for identifying and closing care gaps for patients, including immunizations, cancer screenings and other recommended preventive services.

In terms of chronic disease management, digital health coaches powered by AI have been shown to be effective in reducing the need for physician and hospital visits for patients struggling with illnesses such as diabetes and hypertension.

Finally, in terms of diagnostics, AI algorithms are in some cases now outperforming physicians in detecting skin cancer, breast cancer, colorectal cancer, brain cancer and heart arrhythmias. In many regions of the world that lack access to specialty care, these AI-powered tools in the hands of primary care physicians could provide significant, if not lifesaving, benefits to patients.

3. What are some poor uses of AI?

Lin: AI should not be used to replace physicians or other health care providers. No matter how intelligent AI-powered predictive models, task-oriented algorithms or clinical decision-making tools become, health care has always been and always will be about human-to-human relationships, trust and healing. Take medical advice and triage: Rather than AI replacing human providers for some conditions, we believe that AI support can be integrated into team-based care models that make it easier for human teams to manage an individual patient or a panel of patients. In terms of AI-driven diagnostics, rather than AI replacing human providers who interpret diagnostic tests, we believe that AI can augment the ability of providers to interpret a greater volume of tests at higher speed and better accuracy. AI-powered diagnostic tools can also empower primary care physicians to broaden the services they provide to patients, reducing the need for unnecessary referrals and unnecessary health care costs.

4. How can AI reduce health care costs?

Lin: U.S. health care costs totaled $3.65 trillion in 2018. This amount is larger than the entire gross domestic product of such countries as the United Kingdom, Brazil, Mexico, Spain and Canada. Some of the ways I mentioned already about how AI may improve patient care will also reduce health care costs. In the United States, hospital costs for potentially preventable conditions account for 1 in every 10 dollars of total hospital expenditures. This means that millions of hospital stays and up to $100 billion a year might be prevented with better risk prediction and interventions in the primary care setting with AI.

Management of chronic diseases accounts for most health care costs in the United States; 1 in 7 dollars are spent caring for people with diabetes alone, with the total estimated cost for diabetes over $300 billion a year. When AI-powered population health management and digital health coaching have been integrated into health systems, they have already demonstrated reductions in cost per patient through reduced clinic and hospital visits for patients with chronic illnesses such as diabetes.

Lastly, AI innovations designed to improve physician well-being and reduce burnout will generate billions of dollars of savings by reducing turnover and improving efficiency. Burnout-related turnover costs U.S. health systems tens of billions of dollars every year. Clinical documentation in the electronic health record is not only one of the biggest drivers of physician burnout in the United States, but it causes as much as $90 billion to $140 billion in lost physician time or productivity per year.

5. What do we need to do to ensure that AI won't harm the relationship between patients and physicians?

Lin: For AI to add the most value and for patients and physicians to

embrace it, it needs to support, not supplant, the patient-physician relationship. Health care is fundamentally a social enterprise, powered by committed, caring and collaborative connections between the humans involved. Implemented wisely, AI can free up physicians' cognitive and emotional space for their patients. Undivided attention with compassion is the most powerful diagnostic and therapeutic tool physicians can provide their patients. AI will be most effective when it enhances physicians' ability to focus their full attention on the patient by shifting the physicians' responsibilities away from transactional tasks toward personalized care that lies at the heart of human healing. The challenge will be for humans to have the wisdom and willingness to discern AI's optimal role in modern medicine, and to determine when it strengthens and when it undermines patient care.

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