Coltrain

THE HEALTHCARE REVOLUTION:
Clinicians Enabled by Technology to Confront the Resource

Gautam Nayak, MD, CEO and Co-Founder, Coltrain
with Shivani Shukla, PhD, Chief AI Officer, Coltrain

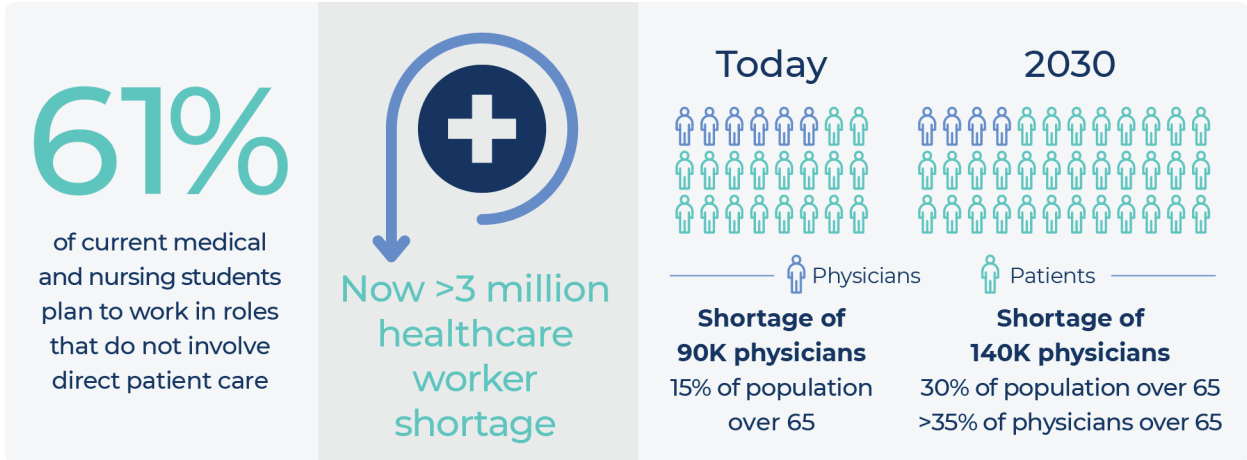## The problem: Fewer clinicians, more patients

As a busy, full-time cardiologist working in a rural healthcare system, resources are increasingly limited and I am constantly being asked to do more with less. I am burned out and so are most of my colleagues working full time in clinical care. Some go part time to combat the stress. Others go into administrative roles to reduce their clinical workload and often make more money. And many others simply leave clinical practice. I'm struggling to understand how our healthcare systems will survive, especially in rural Washington.

Here are some sobering facts on our clinician shortage:

- **By 2024** — 1 in 5 doctors plans to leave the workforce[1].
- **By 2025** — there will be a national shortage of nearly 90,000 physicians. This increases to 140,000 by 2030[2].
- **By 2027** — 35% of physicians will be of retirement age[3].

Our population is growing, but it is also aging quickly, which is a worrisome combination for healthcare. Currently, 15% of the US population is over the age of 65, and that number is expected to double in the next decade[1]. The pace is unsustainable, and as a physician who took an oath to serve patients everywhere, simply conceding that patient care has to suffer due to limited access to or the lack of physicians is incomprehensible. While I would love to think the calvary is coming with more trained colleagues ready to jump into the mix, that just might not be happening.

A recent survey from Elsevier of medical and nursing students shockingly suggested that 61% plan to work in roles that do not involve direct patient care, such as public health, research, or business consulting[4]. A Mercer analysis of the labor market estimates there will be a shortage of more than 3 million healthcare workers by 2026[5]. These aren't interesting facts to banter at the next cocktail party — the proverbial house (of medicine) is on fire.

61% of current medical and nursing students plan to work in roles that do not involve direct patient care

Now >3 million healthcare worker shortage

Today — Shortage of **90K physicians** — 15% of population over 65

2030 — Shortage of **140K physicians** — 30% of population over 65 — >35% of physicians over 65

Physicians · Patients

Can the current healthcare systems put out the fire?

Our current systems are broken, and having created this problem, do not seem motivated to address the myriad of issues with viable solutions. We are confronting clinician burnout with muffins and yoga[6]. We are asking PAs and NPs to fill the physician shortage void with limited resources, less pay, and no oversight. Also, as the life expectancy of our population is set to increase with advanced procedures and medications, there will really be no end to what our current medical technology can deliver no matter how old or frail the population is. Ironically, despite unfathomable advances in clinical technology, healthcare workers are still using tools from the 80's and 90's to connect,

such as pagers, fax machines, and antiquated EMR systems. Without serious solutions to the problems we face, more clinicians will leave clinical practice, fewer will want to go into clinical care (if that is possible), and we'll simply push the problems downstream to already overworked advanced practice providers (APPs). The only way to address the simultaneous phenomena of rising demand and a shrinking workforce is to change how care is delivered — who does it and where it's done — and to adopt technology that can augment the capabilities of what humans can do and automate the tasks that they don't need to[5].

Who does it, and where it's done

The disruption is happening right in front of our eyes. Wal-Mart, Costco, Amazon, CVS, Dollar General and others are leveraging their brand and access to pharmaceuticals to create primary care delivery models within their stores and via a strong digital presence. Direct primary care models, a sort of concierge medicine for the masses, is gaining traction and reducing the need for insurance to cover low cost, predictable care.

Increasingly, there is a shift from inpatient hospital care by bulky, inefficient, expensive systems to hospital care at home, where costs are dramatically lower and the patient experience markedly better. Perhaps most importantly, primary care physicians and APPs are bearing much of the burden of increasing demand, and this brings countless more challenges related to inherent clinical inexperience and other limitations. Care delivery is changing — how do we keep up?

Adopting technology to augment the capabilities of what humans can do...

As primary care shifts away from centralized, inefficient models and our already fragmented healthcare system become more fragmented, we will need better networks. In rural Washington where I work, most smaller hospitals are so isolated that simply getting basic studies like an echocardiogram or CT scan is a stretch and requires transfer to larger centers. At these larger rural hospitals, resources are similarly stretched. In my large tertiary care center, I often have to wait 7-30(!) days to get a radiology read on a chest x-ray. Patients often wait 6 months to get basic specialty consultations. It's unfathomable and unacceptable.

To make matters worse, clinicians are using dated EMRs that require our systems to spend tens of millions of dollars annually for a technology from the 90's that is dependent on doctors inputting notes focused on billing and not our cognition. This has been going on for over 15 years, with no resolution. It's why we are burning out, leaving clinical care, retiring early and unable to handle the growing population. Expecting our systems to innovate and change for problems they helped create is folly. We need an organized approach that doesn't solely rely on archaic systems that create an illusion of centrality but are really fragmented and poorly interconnected. This change has to be led by the clinicians ultimately responsible for care delivery.

The network is the first step

To create sustained change, we need a strong network of clinicians and resourceful technology partners who are aligned with us in our commitment to patients. Current systems in rural America are incredibly fragmented, leaving clinicians on an island with limited to no resources. They need a network. If new models of primary care are popping up, they will need a network to connect with local specialists and with each other. And if patients are receiving care at home rather than the hospital, their providers will need a network. In fact, if patients are currently in a hospital, it is often impossible to get all the clinicians taking care of patients on the same page quickly and efficiently. It's just not a problem hospitals feel incentivized to solve. Clinicians everywhere need a unifying network, powered by technology that actually works for us.

My co-founder Sanjay Khicha and I are both full time practicing doctors who see patients from rural Kansas and Washington, respectively. As a response to the problems above, we developed **Coltrain**, a free, secure, HIPAA-compliant clinical collaboration platform that allows any clinician in any location or system to communicate with colleagues around patient care. The app is already making a difference in these states and beyond, especially in rural areas where access to care is limited. Coltrain

enables connections between primary care providers in small towns, specialists in tertiary care centers, and on to super-specialists in quaternary care centers. At every step, Coltrain connects. We are growing the network, and equipping our clinicians with technology that provides real value. If a clinician is contributing their cognition and time on Coltrain, they need to receive something in return that helps them move the needle personally, professionally, and for their patients.

AI is the next step

AI is changing how humans interact with and use technology in their daily lives. In healthcare, AI has been leveraged to augment humans for years, primarily in radiology and pathology, where learning models derived from decades of human interpretations of digitized data can give us confident reads. The semantic nature of generative AI enables us to create better connections with technology that communicates through common language and can provide insights or give us summarized information beyond usual search engine capabilities. The bidirectionality mimics human communication that can enable conversational knowledge exchange. By keeping humans in the loop and building this technology intentionally

with a higher purpose of enabling healthcare providers, we will have the foundation to seriously address the healthcare crisis.

Coltrain has a vision of incorporating AI into the app to enable and assist healthcare providers in a personalized way. Our latest addition to the app, the identity verification feature, marks our first venture into integrating AI technology within our application that automates registration.

An EMR system connects with hospitals, clinics, laboratories, pharmacies, billing departments, and patient portals. The technology is important but dated — most were designed

on now obsolete software platforms from the 1990s, and do not have the ability to quickly adapt and change. Additionally, as more and more requirements are added to the software, EMRs have deviated from their core clinical functionality, making it harder for clinicians to use them to extract needed information on the patients they care for. And to make matters worse, clinicians are required to input cognitive notes without ever getting actionable data back on the clinical care they deliver.

At Coltrain, we envision an alternative to this information model that aggregates communications and automates repetitive processes. We see Coltrain as a highly functional, patient-centered tool that simplifies the clinical data flow for the busy clinician while maintaining the EMR as a back-end repository of data. And importantly, AI has the ability to evaluate and provide knowledge.

Dr Shivani Shukla, our Chief AI Officer offers some broad applications that Coltrain is set to implement in the future:

1) **Transcription and Summarization:**
AI-powered language capabilities can aid in transcription and summarization processes, saving clinicians time and effort. By automatically summarizing case encounters and extracting relevant information, AI can help streamline the documentation process, improve accuracy, and reduce the administrative burden on clinicians. Over time, this technology will become the foundation for better electronic medical records that focus less on billing and compliance, and more on impactful patient-centered narratives and data delivery that enable better care and clinical efficiency.

2) **Virtual Assistants and Personalization:**
AI-powered virtual assistants can provide real-time assistance to clinicians, offering quick access to comprehensive medical information and the latest research. These assistants can empower clinicians by analyzing vast amounts of research articles, clinical guidelines, and cases within Coltrain to provide personalized support to every user.

a) **Personalized Communication:** Coltrain would create a distinct profile of every clinician for assisting the user with
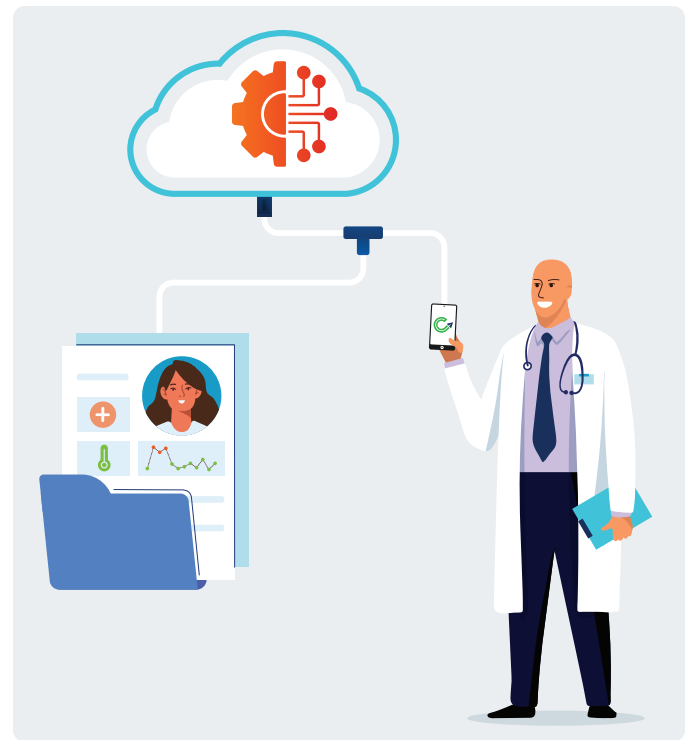
their communication during cases, chats and tele conversations. This could include suggestive texts/prompts while in a conversation, on-demand summarization, on-demand knowledge/research support that is relevant to the clinician and the conversation, and even transcriptions at the end of conversations.

b) **Data-driven Insights:** The AI and Machine Learning powered personalized virtual assistant could provide support with clinicians' call schedules and any radiology information in the form of pictures or text included in cases and chats. The technology could also assist in triaging patients, flagging urgent cases, and routing those cases to the appropriate clinician.

i) **Rural Reach:** This technology is ideally suited for resource-limited rural settings. The virtual assistant (co-pilot) will not only assist with basic administrative tasks but also play a crucial role in bridging the healthcare access gap. It can facilitate remote consultations, manage data efficiently, and provide vital health information and guidance in areas where medical resources and personnel are scarce.

ii) Feedback and Continuous Adjustments: At Coltrain, we pride in learning from our experiences and those of our users. The virtual assistant would have specific feedback collection mechanisms. While it will be learning from the behavior of the user continuously, it will also explicitly ask for feedback for making continuous adjustments.

3) Training and Education: AI-based platforms can provide personalized training and continuous education for clinicians. These platforms can offer interactive modules, simulate real-world scenarios, and provide feedback, allowing clinicians to improve their skills and stay updated with the latest medical advancements. While AI cannot replace the expertise and empathy of human clinicians, it can enhance their capabilities, streamline processes, and maximize efficiency, thus potentially mitigating the clinician shortage in the United States.

Why Coltrain?

US healthcare's problems are diverse and growing. Unfortunately, the consumers of healthcare (clinicians and patients) bear the brunt of a flawed system enabled by misaligned incentives. No one person, organization, or entity can turn the tide, but collectively, aligned behind a coherent vision for change, clinicians can take control. Despite a growing acceptance of putting healthcare in the hands of technologists, we recognize that all healthcare delivery is local. Patients want and need their primary care and specialty team within a reasonable geographic vicinity. They want personal relationships with their providers and minimal barriers to accessing this care. At the same time, clinicians want to provide this care, gain agency in the process, and ensure what we do today will compound interest for a better system tomorrow. I have been entering data into the EMR for decades, yet have nothing to show for it, other than more burnout and less technical functionality. I use pagers and fax machines because we've been told they are HIPAA-compliant, though most clinicians use non-secure, non-HIPAA compliant standard text messaging, which is a better way to quickly communicate. Our patients entrust us to make life and death decisions daily, yet our systems feel we cannot be trusted to interact with technology appropriately and limit us to antiquated tools. Healthcare requires that we give innovative clinicians an opportunity to do better.

To be sure, Coltrain's approach of enabling the individual clinician with a free and open network inside a HIPAA-compliant infrastructure delivering modern tools creates problems for an established system that relies on friction and delays to function. If clinicians no longer need a dated EMR to write a note, or pagers and faxes to communicate, and have a wealth of information and efficiency tools at their disposal, our entire system will change. An entire middle layer of bureaucracy dependent on inefficiency, but responsible for the lack of progress and innovation, will have to step aside. Having spent billions on bad technology over the past few decades and doubling down on this technology now to support their past decisions will be inevitable. But what do we, the clinicians in the trenches caring for patients, have to lose? Our system is broken, and the evolving dynamics are unsustainable, especially in rural areas where resources are even more limited and clinicians are on an island.

Coltrain empowers clinicians to become humanity-focused technologists, and wants to lead on changing the mindset in medicine to inspire more of us to stay and even more to enter the profession. As a company led by two passionate physicians, we understand that change needs to happen incrementally and within the guardrails of a system that, at its core, is led by incredibly smart people trying hard to do the right thing. Clinicians want to evolve and develop — continuous education is built into our DNA. Our patients are depending on us for their lives and we need to rely on each other to protect our profession. With Coltrain today, better collaboration leads to better care. We envision a future where this collaboration builds trust and shared equity for clinicians everywhere, powered by modern technology and patient-centered systems that work for the key stakeholders in medicine — clinicians and patients.

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For more information, please contact us!

Gautam Nayak, MD FACC
Co-Founder and CEO, Cognition Med
gautam@coltrain.io

Sanjay Khicha, MD FACS
Co-Founder and Chief Clinical Officer, Cognition Med
sanjay@coltrain.io