

Medical Services in Rural Areas: The Value of a User-Friendly Approach to Solving Macro Socio-Economic Issues in Medicine and Beyond

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ABSTRACT

Using AI embedded in the BimiLeap.com platform of Mind Genomics, the authors present a four-phase system to understand macro problems. The topic of this paper is the nature of emerging issues regarding medical services in rural areas. The four phases, all powered by generative AI (ChatGPT 3.5), use the strategy of stating that the problems have been solved, and it is the task of AI to discuss how the problems were solved. Phase 1 presents the “human” face of the problem, creating simulated interviews with people. Phase 2 presents a series of problems and solutions, assuming that the problem has already been solved. Phase 3 presents problems in the topic area, along with points of view and solutions of mind-sets of professionals with different ways of approaching the issue. Phase 4 focuses on the identification of potential problems of medical care looming in the near future. The simulation approach provides an easy template to explore macro topics in a period of hours and days, with generative AI providing straightforward answers that are easy to understand by the general population.

Keywords: AI in Rural Healthcare Solutions, AI Solutions, Generative AI, Healthcare Analysis, Mind Genomics, Rural Health Challenges

Abbreviations

AI	: Artificial Intelligence
ChatGPT	: Chat Generative Pre-Trained Transformer
EHR	: Electric Health Records
NP	: Nurse Practitioner
PA	: Physician Assistant

Introduction-Physician Shortages and Healthcare Challenges in Rural Areas

Doctors are few in distant areas. Increasing physician turnover affects medical access, especially in disadvantaged communities. Losing doctors in rural areas where healthcare resources are few

makes treatment tougher for patients [1]. Family, income, and health affect a doctor's decision to resign, but structural reasons may be more important [2]. Laws, administrative concerns, and inefficiencies have complicated healthcare, making it harder for clinicians to focus on patients [3].

There are several bureaucratic and administrative burdens on physicians. Physicians spend less time on patient care due to Electric Health Records (EHRs) and administrative tasks. Although these components are crucial for accurate recordkeeping, many physicians claim these distract them from patient care. This frustration may lead to burnout, leaving many doctors dissatisfied with a system that prioritizes paperwork over personalized care. Administrative tasks may obscure doctors' most critical skills—diagnosis, patient interaction, and treatment plan design [4-6].

The lack of medical facilities and specialized services in rural areas is problematic. Due to funding constraints, many

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rural hospitals are closing-exacerbating healthcare inequities. Understaffing, patient loads, and a lack of emergency help make work-life balance difficult for rural physicians. Due to external pressures, many rural doctors move to cities or quit, worsening rural patients' medical requirements [7-9].

The healthcare crisis impacts public health. Fewer physicians cause longer wait times, delayed diagnosis, and slower treatment. Doctor shortages hinder chronic illness patients from obtaining critical follow-ups and preventive therapy, deteriorating their health. Chronic disorders including diabetes, obesity, and heart disease are common in these areas, making the situation urgent. Their limited healthcare access fosters bad health and damages the community.

Rural physician shortages impact low-income, elderly, and chronically ill patients. Vaccinations, maternity care, and mental health services diminish-marginalizing vulnerable communities. Telemedicine is difficult for rural health systems to employ due to insufficient infrastructure and intermittent internet connectivity. The result is that healthcare standards vary considerably in rural and urban locations.

In terms of solutions, addressing this crisis will require systemic policy changes that focus on reducing the administrative burden for physicians and improving working conditions in rural areas. One of the primary solutions might be to offer higher incentives like student loan repayment programs or financial bonuses to those doctors willing to practice in rural areas. Another proposed approach is improving telemedicine services. While telemedicine may not replace the need for physical checkups or surgeries, it can provide an essential stopgap by allowing physicians from urban centers to offer consultations and diagnoses to patients in rural settings. Expanding these programs could help alleviate the increasing strain on rural healthcare systems.

Another approach involves medical education reforms, such as offering targeted rural residency programs that incentivize new medical graduates to start their careers in rural regions. Community-based health programs can help train and retain young medical talent by deepening their connection to rural populations and demonstrating the emotional and professional rewards of serving underserved communities. Incentivizing healthcare professionals with higher wages, better professional development opportunities, and support systems can also help stem the tide of physicians leaving the profession.

Focusing on Accessibility of Ideas and Actionability of Solutions - Using AI and Mind Genomics

The focus on academic analysis often overlooks everyday concerns that require immediate solutions, making academic work inaccessible and irrelevant to the broader public, policymakers, and non-specialist stakeholders. A user-friendly approach to large, systemic issues, such as healthcare in rural areas, can make the problem-solving process more inclusive and actionable [10]. Generative AI plays a crucial role in synthesizing situational aspects that clarify problems without the jargon of formal academic papers. Keeping the focus on solutions provides a platform for meaningful discussions and decision-making, allowing for deeper insight and more effective modeling of problem-solving scenarios. This approach can

be applied across sectors, promoting real dialogue and swift actions for policymakers, citizens, entrepreneurs, and grassroots movements. Generative AI can be programmed to continually adjust to evolving data and scenarios, offering insights and directions as conditions change. This approach democratizes complex problem-solving-allowing anyone, whether it be policymakers or regular citizens, to engage effectively. By simplifying and compartmentalizing complexities into actionable steps, the chances of real change increase exponentially. We need to shift from merely documenting problems to actively solving them, whether in the fields of medicine, social policy, or economics [11-16].

Phase 1: AI & Mind Genomics in Practice: Only Yesterday - Using Edward Bellamy's Vision of the Future by Writing About it as the History of "Crisis and Repair"

Writing about the future as if it has already happened offers a way to avoid uncertainty and speculation in making predictions. This approach allows for a clear framework for understanding current trends and challenges, enabling writers, readers, and policymakers to envision potential outcomes and critically analyze systems, processes, and behaviors. In medicine, particularly in rural areas, this style of writing presents a unique opportunity to symbolically solve issues by imagining a world where current healthcare challenges have been effectively addressed. This approach also inspires action-encouraging both creators and readers to assess the feasibility of solutions and connect the present with the envisioned future.

AI-generated interviews can provide a dynamic way to understand rural medicine-allowing for more critical and engaging discussions. These interviews mimic real conversations, encouraging audience participation and allowing for a deeper understanding of human experiences. The value of AI in this context lies in its ability to contextualize information based on real-time interactions, offering a more comprehensive understanding of the field. Although there is a risk of blurring the lines between reality and AI-generated assumptions, AI-generated simulations can help identify pressing questions and prompt curiosity [17-19].

Table 1 shows AI-generated interviews. These interviews were generated using the generative AI available on the Mind Genomics platform, BimiLeap.com. The AI is available in the Idea Coach option, immediately available to the user. All results in this paper emerged from the use of AI and Idea Coach, with the "text output" polished by the authors, and revised to ensure clarity.

Table 1: Crisis and Repair - Eight AI-generated interviews about medicine in rural areas.

Instructions to the AI

Please give me interviews from different people who live in rural areas. In their own words, I want to know who they are, what is their medical issue, what was their experience in medical services before the "great repair," and what is their experience in medical services now, after the great repair. Use quotes to show what they are saying.

The Eight Simulated Interviews

1. Laura Hernandez, Retired Teacher; Medical Issue: Diabetes
Before: “I was diagnosed with Type [DIABETES TYPE] Diabetes back in [YEAR], and let me tell you, it was such a challenge. The nearest specialist was a three-hour drive, and I had to manage my blood sugar on my own most of the time. I’d wait on hold for hours trying to reach the doctor’s office for a quick question, knowing they only saw patients twice a month at the clinic.”

After: “Now? Everything’s changed. They set up telehealth kiosks right in our little town. I talk to my diabetes specialist virtually every week, and there’s a nurse here who checks my levels regularly. I feel so much more confident managing my health. I haven’t had to make that long drive in years.”

2. Jonas McGill, Farmer; Medical Issue: Chronic Back Pain
Before: “I injured my back a few years back, lifting machinery. The pain was constant, and appointments were hard to come by. I’d sometimes wait months to see a doctor, and by the time I got in, my pain would be even worse. It was terrifying running a farm when I wasn’t sure I’d be able to stand the next day.”

After: “The new mobile clinics have been a lifesaver. Twice a month, these medical vans roll into town with doctors, physical therapists, and chiropractors. I don’t have to wait months. My treatment plan is coordinated, right there in my barn sometimes. I’m actually able to work without pain ruling every part of my life.”

3. Sarah Latham, Single Mother; Medical Issue: Pediatric Care for two Children

Before: “It was stressful, especially with two little kids. Anytime one got sick, it was a scramble to figure out how to get to a doctor. Pediatric services were barely available out here, and driving to the nearest hospital was time and money I didn’t have. One time, when Emma got pneumonia, it was terrifying figuring out if I could get her care fast enough.”

After: “We now have a full-time family practitioner in town. And there’s a well-baby clinic staffed with pediatric specialists once a week. I remember when my youngest was sick last winter, I didn’t panic because I knew help wasn’t far away anymore. We’ve got peace of mind now - that makes all the difference.”

4. Riley Anderson, Rancher; Medical Issue: Mental Health & Stress

Before: “I’d been dealing with anxiety for years, especially during the bad droughts. The constant pressure of trying to keep the ranch running while raising a family took its toll. There were no mental health services nearby, and every psychologist I called had either left town or was completely booked. So I just kept on bottling it all in.”

After: “Part of the solution around here was bringing in mental health support. They even embedded mental health professionals into nearby multi-purpose clinics. Now, I have a therapist I can see regularly, and it’s all part of the same healthcare system. I didn’t realize how much it would help until they made it accessible.”

5. Anna Patel, Small Business Owner; Medical Issue: Cardiovascular Disease

Before: “Managing my blood pressure was pretty challenging. I would have to drive two hours just to get my blood pressure meds refilled. Sometimes I had to stretch my prescription just to avoid extra trips. Following up with my cardiologist felt like a headache, too. It was like the system didn’t understand how far we lived.”

After: “After the telemedicine infrastructure was set up, that hassle disappeared. From right here in my town, a doctor comes in every other month to check patients in person. My health’s been way easier to manage now.”

6. Tommy Benson, Retired Miner; Medical Issue: Cancer (in remission)

Before: “I was diagnosed with prostate cancer in [YEAR], and that was the most trying time of my life. Every chemotherapy appointment meant an hour round trip with my daughter driving me. Follow-up care was few and far between. It felt like I was on my own during some of the darkest days.”

After: “Thank God they brought oncology services closer to us a few years back as part of that big push in [YEAR]. Now, my follow-up visits happen just minutes away. When I went into remission, the regular screenings stayed easy to access. It gives me peace of mind knowing I won’t have to trek for miles if something flares up.”

7. Margaret Rivers, Elementary School Principal; Medical Issue: Family Healthcare Coordination

Before: “Trying to manage healthcare for my parents, myself, and my three kids was exhausting. Dad had COPD, and Mom was dealing with early dementia. I’d spend hours managing appointments between them and my own regular visits. None of the doctors seem to talk to each other, and getting everyone seen was nearly impossible.”

After: “Now we’ve got better integrated healthcare. They rolled out care coordination where nurses and health professionals create personalized family plans. My dad’s respiratory specialist and mom’s gerontologist communicate weekly. And when they come for check-ups, they see multiple specialists in one visit. I can finally focus on caring for them without feeling buried under logistics.”

8. Chris Owens, Tech Worker (Remote); Medical Issue: General Healthcare Access

Before: “After moving back to help out with my family farm, I was shocked at how bad the medical care out here was. People in cities complained about wait times, but here it went deeper than that. Routine stuff, like check-ups or flu shots felt like a full-day ordeal. There was little incentive for young people like me to stay here long term if basic healthcare wasn’t even accessible”

After: “Part of the solution around here was bringing in mental health support. They even embedded mental health professionals into nearby multi-purpose clinics. Now, I have a therapist I can see regularly, and it’s all part of the same healthcare system. I didn’t realize how much it would help until they made it accessible.”

Phase 2: The Great Repair - How AI Creates Questions and Answers About Issues in Rural Healthcare

Discussing rural healthcare problems as if they have already been solved offers a unique and engaging narrative, allowing readers to contemplate potential solutions. This shift from focusing solely on challenges to imagining a future where these issues no longer exist gives hope and transforms a conversation into a proactive and optimistic one. Using AI to suggest future solutions taps into the imagination and problem-solving capacity of both writers and readers. By treating hypothetical advances as past successes, readers can explore and discuss the technical and logistical feasibility of these future technologies. This approach reshapes the narrative, positioning the reader at the edge of potential success, and avoiding barriers encountered when proposing actionable solutions. Table 2 presents 14 problems and solutions, as envisioned by AI, with the assumption that the problem has already been solved [20-23].

Table 2: Problems and solutions about rural health care, as developed by AI, under the assumption that the problem has already been solved.

Instructions to the AI

In [PAST YEAR], the problem with rural healthcare was severe. Here is what was discussed: The healthcare system faces a critical challenge: a significant exodus of physicians. It is now [FUTURE YEAR]. The problem has been solved. Rural healthcare is on the move, and people are delighted.

I would like AI to generate a series of questions and answers about how the system was improved. Exactly what happened. Please follow the four-step structure below.

1. What was the problem in [PAST YEAR]? Preface by **PROBLEM**:
2. How did the problem manifest itself? Give a short description in a paragraph of sentences. Preface by **MANIFESTATION**:
3. How was the problem addressed and fixed? Be specific, in a paragraph of about five sentences. Preface by **HOW FIXED**:
4. Describe the same situation today, and how it is addressed smoothly after the fix. Preface by **APPROACH TODAY**:

The 14 Questions and Answers Returned by AI

1. **PROBLEM:** There was a shortage of medical professionals willing to work in rural areas.
MANIFESTATION: Many rural clinics lacked basic staffing, with some regions going weeks without a full-time physician. Residents had to travel long distances to seek care, delaying crucial treatment. This led to higher mortality rates from preventable diseases and rampant health inequalities between urban and rural populations.
HOW FIXED: A series of incentives was introduced to encourage physicians to work in rural areas, including higher salaries, student loan forgiveness, and advanced use of telemedicine. Rural residency programs were expanded, and mobile health clinics were deployed. AI-based diagnostic tools were also adopted, allowing doctors in remote locations to provide top-tier care even without specialists on-site.

APPROACH TODAY: Today, physicians are no longer scarce in rural areas thanks to comprehensive rural health education programs and partnerships with urban hospitals. Patients can access specialists via telemedicine, with AI-powered diagnostic systems assisting local doctors. Mobile clinics continue to provide routine care for those in even the most remote locations.

2. **PROBLEM:** A severe shortage of physicians in rural areas, leading to inadequate healthcare access for rural populations.

MANIFESTATION: The rural areas experienced extreme healthcare deficiencies, with many clinics closing or operating at reduced capacity due to the exodus of physicians. Patients in these areas often had to travel great distances to receive basic medical services, and on many occasions, critical treatments were delayed or unavailable. Furthermore, the lack of specialists in these regions exacerbated healthcare challenges, creating bottlenecks in healthcare delivery and ultimately worsening patient outcomes.

HOW FIXED: To resolve this, the healthcare system implemented targeted incentive programs, including student loan repayment initiatives for doctors who committed to working in rural areas for a specified duration. Telemedicine infrastructure was expanded to bring specialists to rural communities virtually. AI-powered diagnostic tools, supported by nurse practitioners and physician assistants, allowed for more streamlined care, reducing the need for constant physician presence. Additionally, robust housing and community engagement initiatives made rural living more attractive for medical professionals. Comprehensive collaboration between local, state, and federal governments created a sustainable support structure for rural healthcare.

APPROACH TODAY: Today healthcare in rural areas is thriving. Physicians no longer feel isolated, as they collaborate with specialists through telehealth platforms. Medical professionals in these communities enjoy financial incentives and have flexible work models, making rural healthcare an appealing choice. AI and improved diagnostic tools have reduced the administrative burdens of healthcare providers, allowing them to spend more time with patients. Clinics are operating at full capacity and patients can receive timely and specialized care without the need to travel long distances.

3. **PROBLEM:** Rural healthcare facilities were underfunded and could not sustain important infrastructure, such as modern diagnostic equipment.

MANIFESTATION: Many hospitals in rural areas had outdated technology, forcing residents to travel to larger urban areas for diagnostic tests like MRIs or CT scans. This contributed to delayed diagnoses and treatment, exacerbating health disparities.

APPROACH TODAY: Today, rural health facilities are indistinguishable from those in urban centers when it comes to diagnostics. Advances in portable imaging devices and government-backed upgrades keep technology on par with

national standards. Patients can access and review test results remotely through telemedicine platforms, minimizing delays in treatment.

4. **PROBLEM:** Occupational burnout among medical professionals in rural settings was leading to a mass exodus, further stretching already limited resources.

MANIFESTATION: Doctors working in rural areas often handled excessive workloads, saw too many patients, and felt isolated. Many quit their positions or moved back to urban areas, leaving patients without consistent care providers. Rates of burnout were as high as [PERCENTAGE], leading to severe retention challenges.

HOW FIXED: New policies mandated shorter working hours, added mental health support for healthcare workers, and implemented “buddy systems,” pairing rural physicians with peers in urban areas for virtual collaboration. Programs offering paid sabbaticals brought in temporary workers and allowed full-time staff to recharge.

APPROACH TODAY: Work-life balance is now treated as a critical priority for healthcare staff in rural areas. Rotational staffing models allow professionals time off without burnout becoming a factor. Wellbeing programs have been institutionalized, and telehealth connections give rural workers access to urban specialists, so they never feel professionally isolated.

5. **PROBLEM:** Transportation to healthcare services was incredibly difficult for rural populations, particularly elderly individuals.

MANIFESTATION: Rural patients frequently missed vital medical appointments because of a lack of public transportation or long distances to the nearest clinic. This disproportionately impacted seniors and people with chronic health needs, leading to untreated medical conditions and unnecessary suffering.

HOW FIXED: Autonomous transportation was introduced, with a specific emphasis on rural access. Governments subsidized self-driving shuttle services that operated in rural regions, providing reliable and affordable transit. Additionally, healthcare-at-home services were expanded for elderly and high-risk patients.

APPROACH TODAY: Autonomous vehicles now ferry patients from their homes to local healthcare centers or mobile clinics. Care-at-home services have adapted, incorporating AI-assisted monitoring devices, so frequent check-ups can happen from the comfort of people’s homes without travel at all.

6. **PROBLEM:** Rural areas lacked specialists, making it difficult for patients to receive advanced or specialized care.

MANIFESTATION: When rural patients needed specialized care, such as for oncology or cardiology, they were often referred to distant urban centers. This added significant costs, time, and stress to patients who were already unwell, sometimes delaying necessary care by weeks or even months.

HOW FIXED: An investment in telemedicine technology allowed specialists located in urban areas to provide consultations remotely. Rural-community nurses and primary care providers were specially trained to collaborate with these specialists, so patients could receive advanced care without needing to leave their local communities.

APPROACH TODAY: Today, rural patients can see specialists virtually within hours through telemedicine platforms linked to AI diagnostic tools. Local healthcare teams facilitate the physical exams and tests required for the consultation, creating seamless communication between patients and specialists.

7. **PROBLEM:** There was a severe lack of mental health services in rural areas, leading to untreated psychological conditions.

MANIFESTATION: Rural residents had few counselors or psychiatrists available, resulting in long waiting periods for mental health services, if they existed at all. Suicide rates were disproportionately high in rural areas, especially among younger and farming populations, and many individuals turned to substance abuse as a means of coping.

HOW FIXED: Local governments established remote therapy platforms accessible from any smartphone or computer with subsidies for low-income populations. Licensed support professionals were recruited to rural regions through loan forgiveness programs. Additionally, community mental health clinics were opened, offering both in-person and virtual counseling sessions.

APPROACH TODAY: Virtual therapy and counseling are normalized and widely accessible, with public telehealth infrastructure built into the healthcare system. Emergency mental health response units are available in rural areas, providing swift intervention in crisis situations, and preventative care is regularly offered through local and virtual platforms.

8. **PROBLEM:** Rural maternal healthcare services were limited, endangering the lives of mothers and babies.

MANIFESTATION: Many rural areas lacked obstetricians, forcing pregnant women to travel long distances to city hospitals for prenatal checkups, deliveries, or emergency care. This led to higher rates of maternal mortality and complications during childbirth.

HOW FIXED: Telemedicine prenatal care services were offered as standard practice to monitor rural pregnancies, while midwives and nurse practitioners trained in maternal health were stationed in rural clinics. In case of emergencies, rural hospitals now have birthing suites equipped with state-of-the-art monitoring systems linked to urban-based obstetric specialists.

APPROACH TODAY: Prenatal care is delivered seamlessly through virtual appointments by obstetricians, and telemonitoring systems track the health of mothers and babies in real-time. Emergency deliveries are safe and common at local health centers, and trained rural midwives provide continuous, in-person care.

9. **PROBLEM:** Lack of Internet and cellular infrastructure made it hard for rural populations to access telehealth services.

MANIFESTATION: Many rural populations could not use telemedicine services because of inadequate broadband or mobile coverage, meaning some individuals had no way of connecting to the primary source of healthcare. This led to missed appointments and acute complications from untreated conditions.

HOW FIXED: Governments and private companies partnered to roll out G and broadband internet in all rural areas, ensuring accessible and affordable connectivity. Special grant programs were established for rural healthcare providers to give out loaner tablets or computers for those without necessary devices.

APPROACH TODAY: Telehealth is now a cornerstone of rural healthcare, with reliable Internet infrastructure supporting every patient. Dedicated kiosks with high-speed connectivity are available at community centers and can be reserved for telemedicine appointments, ensuring no one is left out due to tech issues.

10. **PROBLEM:** A severe lack of specialists in rural areas.

MANIFESTATION: Patients who needed specialized care—such as cardiology, oncology, or endocrinology—had to travel to urban centers, often hours away, for consultations or treatment. This put a significant strain on patients, especially those with chronic illnesses, who could not manage frequent long-distance travel. As a result, many deteriorations in health or complications were poorly managed, leading to increased mortality and morbidity rates in rural settings.

HOW FIXED: The introduction of a specialized telemedicine network addressed this directly. Rural general practitioners partnered with urban specialists to provide virtual consultations, enabling patients to access specialized care from their homes or local clinics. Transportation systems were also improved, making regular mobile specialist clinics possible in remote towns. AI tools allowed routine diagnoses and treatment plans to be handled locally, reducing the specialist dependency. A financial incentive was introduced to encourage specialists to provide discounted virtual consultations to rural patients.

APPROACH TODAY: Specialists now regularly participate in virtual “telehealth rounds.” Local physicians can seamlessly refer their patients to these specialists via a streamlined telemedicine portal, ensuring patients receive quality care without leaving their communities. Routine diagnostic and follow-up treatments are conducted locally, with advanced AI tools assisting real-time monitoring and data sharing between primary care and specialists.

11. **PROBLEM:** Scope-of-practice laws deterred nurse practitioners (NPs) and physician assistants (PAs) from being fully involved in rural care.

MANIFESTATION: Despite having trained medical personnel like NPs and PAs in rural communities, strict scope-of-practice laws in many states limited what they could do independently, keeping them reliant on monitoring

physicians or hospital-based care. This regulation resulted in bottlenecks in care provision, with patients often having to wait for physician-approved treatment even for simpler cases. The untapped potential of these healthcare professionals contributed to inefficiencies in the system.

HOW FIXED: In response, federal and state legislative bodies reviewed and expanded the scope-of-practice for NPs and PAs, allowing them to practice independently in underserved areas. Furthermore, they were incorporated into a network anchored by AI diagnostic systems, with regular touchpoints with supervising physicians via telemedicine when needed. Specialized training programs were offered, increasing their competencies in areas such as prescribing medications and managing chronic diseases. An integrated team-based approach was promoted, where NPs and PAs played leading roles in primary care delivery in these regions.

APPROACH TODAY: NPs and PAs are the backbone of rural healthcare systems. They operate autonomously in many rural clinics, managing routine healthcare and chronic disease management independently but consulting with physicians as required. The AI diagnostic systems bolster their capabilities and improve diagnostic accuracy, ensuring patients get high-quality care rapidly.

12. **PROBLEM:** Lack of technological infrastructure in rural areas.

MANIFESTATION: Patients and clinics lacked the broadband connectivity necessary for effective telemedicine. EHR systems were either unavailable or poorly integrated, preventing seamless access to patient data. High-tech tools like diagnostic AI or electronic consultations weren’t available in many rural clinics due to the absence of up-to-date hardware and software, further exacerbating healthcare disparities.

HOW FIXED: A federal initiative focused on expanding rural broadband launched in [YEAR], ensuring high-speed internet access for over [PERCENTAGE] of rural areas by [FUTURE YEAR]. Governmental partnerships with technology companies provided affordable hardware and telehealth platforms. Clinics were equipped with AI diagnostic tools, while grant-funded programs trained local staff on their use. Additionally, an EHR integration mandate connected all rural medical facilities to regional and national health data exchanges.

APPROACH TODAY: Every rural clinic now has access to high-speed internet, enabling essential telemedicine services, AI-powered diagnostics, and real-time EHR sharing with other institutions. Patient data is secure and can be accessed by providers across the healthcare system, ensuring continuity of care regardless of location. Local doctors and staff are proficient in using these systems, resulting in faster, more accurate healthcare services.

13. **PROBLEM:** Lack of incentives for medical students to work in rural areas.

MANIFESTATION: Most medical students avoided rural areas due to higher financial incentives in urban or suburban hospitals, better lifestyle opportunities, or more advanced research and teaching facilities. Rural clinical

placements were minimal, and rural living conditions were often perceived negatively. Limited mentorship and professional development opportunities further deterred potential candidates from considering rural practices.

HOW FIXED: Increased funding for rural clinical rotations during medical school was established, providing stipends and loan forgiveness for those committing to rural service post-graduation. A new rural healthcare fellowship, complete with comprehensive training programs and mentorship schemes, was designed to make rural practice more appealing. Housing subsidies, continuing education grants, and community leadership roles were created to make rural work financially and personally satisfying. Medical school curricula also incorporated rural healthcare challenges into their coursework to foster empathy and interest.

APPROACH TODAY: Medical students now view rural healthcare as an attractive career option. Loan forgiveness, housing incentives, and job flexibility provide competitive advantages, and there's higher prestige associated with contributing to underserved areas. Regular mentorship and fellowship programs strengthen their career growth and provide a clear route to professional development within rural healthcare.

14. **PROBLEM:** Insufficient mobile healthcare units and outdated equipment.

MANIFESTATION: While some regions used mobile healthcare units to provide services to remote populations, these units were not sufficient in number, and many suffered from outdated equipment and inconsistent schedules. Long wait times, limited types of services, and infrequent visits made it hard for residents to rely on mobile units for healthcare, especially for diagnostic tests and specialist consultations.

HOW FIXED: New federal funding allowed for the creation and deployment of high-tech mobile healthcare units equipped with diagnostic technology, portable labs, and telehealth capabilities. Partnerships with private companies ensured the mobile units had access to the latest equipment and maintained operational consistency. The fleet of mobile units was increased, with designated schedules and digital appointments to ensure every area was served regularly. A national system for tracking mobile units and the care they provided was integrated with digital health records, so rural patients could seamlessly continue care during clinic or hospital visits.

APPROACH TODAY: Mobile healthcare units now operate on strict schedules to ensure that rural populations get regular access to services. These modern units are equipped with diagnostic AI technologies and telemedicine platforms, linking rural patients with hospital-based specialists in real-time. All services, from primary care to basic diagnostics, are available on these units, which means rural residents don't have to wait long intervals for mobile visits.

Phase 3: Mind-Sets: Medical Professionals Who Face the Same Issues, but Respond Differently

Rural medicine faces challenges such as healthcare access, staff shortages, and outdated facilities. Programs like telemedicine and mobile clinics improve care quality, but issues like specialized services and economic constraints persist. Solutions to these problems cannot be solved with a one-size-fits-all approach. Different stakeholders, including governments, healthcare providers, and community members, propose varying solutions. Some believe technology can bridge the gap between rural and urban medical experts, while others emphasize locally focused solutions. Understanding these mind-sets is crucial for evaluating solutions that align with community needs and avoid exacerbated inequalities. Table 3 presents the issues and the response of two relevant but different mind-sets to the same issue [24-27].

Table 3: Issues in rural healthcare and the response of two different mind-sets to each issue.

Instructions to the AI About Current Issues in Rural Healthcare

Many of the problems of rural medicine have been solved or are being addressed. At the same time, as in every field, there are different mind-sets, different ways of addressing the same problem. For issues related to medicine in rural areas, give me a sense of the issues which emerge, and of the disagreeing mind-sets. I don't know which one is right. Tell me the value of knowing the mind-sets for the problem.

15. Current Issues in Rural Healthcare, and the Response of Two Mind-Sets to Each

1. AI-driven diagnostics could create new forms of physician-patient disconnection

Technophile Doctor: Will push for faster AI integration with minimal human interference. Compassionate Care

Advocate: Advocates for the use of AI but emphasizes maintaining the human touch in healthcare to avoid alienation.

2. Rural healthcare facilities struggle with cybersecurity issues in remote areas

Technologist Doctor: Will encourage large investments in secure digital platforms and staff retraining.

Fiscal Conservative Doctor: Will lean towards low-cost, minimal solutions, considering both the investment and the ROI for small rural clinics

3. Over-reliance on telemedicine negatively affects hands-on care among rural populations

Tech-Savvy Physician: Believes telemedicine is an essential equalizer, solving distance problems.

Traditionalist Physician: Will argue that the physical connections and in-person care are irreplaceable for complex problems.

4. Early indicators can warn us that physician burnout rates will increase due to expanding scope of practice regulations

Progressive Doctor: Feels that expanding scope helps alleviate workloads in rural areas.

Skeptical Doctor: Will caution that this creates unrealistic workloads, leading to stress, mistakes, and eventual burnout.

5. Anticipate that rural areas may face shortages of specialist physicians even after others return

Specialist Advocate: Will suggest heavy incentives, like loan forgiveness, to bring specialists to underserved areas.

Generalist Advocate: Will argue to expand and deepen training for generalists, allowing them to perform more procedures rather than importing specialists.

6. The equity gap widening between rural and urban areas, particularly affecting minority populations

Data-Driven Physician: Closely tracks health outcomes for different demographics to detect disparities early.

Community-Oriented Physician: Focuses on qualitative community reports, advocating for more localized health initiatives rather than national-level health tracking.

7. Rural healthcare infrastructure lagging behind in Green Energy and sustainability initiatives

Environmental Advocate Doctor: Will demand government-led overhauls toward sustainable energy systems.

Pragmatic Physician: Advocates smaller, scalable sustainability measures that can be applied incrementally given budget constraints.

8. Digital illiteracy among rural populations is limiting the success of tech-based healthcare solutions

Tech-Promoter: Will offer greater funding for digital literacy programs and internet access expansion, focusing on training staff.

Social Services Advocate: Emphasizes the importance of social services, such as in-person aid or home visits, instead of pushing digital literacy.

9. AI solutions might exacerbate inequalities between rural and urban healthcare

Optimistic AI Advocate: Sees AI as an equalizer but pushes rural practitioners to adapt quickly with minimal delay.

Skeptical AI Doctor: Argues that AI systems in rural areas will likely lack real-time updates or proper implementation, especially if underfunded.

10. Rural healthcare systems are overburdened by rising medical-tech costs

Free-Market Advocate: Believes free-market competition will bring down medical-tech costs to support rural areas.

Government-Involvement Proponent: Pushes for government subsidies or price controls so rural health systems aren't financially crippled by cutting-edge tech.

11. Looming ethical crisis in Rural Health due to unequal access to gene therapy between rural and urban populations

Bioethics Advocate: Will recommend strict guidelines ensuring rural populations have as much access as urban ones.

Private Sector Optimist: Believes private companies will drive down costs, with access eventually trickling down to rural areas in due time.

12. Lack of sufficient mental health resources in rural areas as a growing pandemic of mental health issues looms

Mental Health Champion: Will propose dedicated resources to bring in more counselors and psychiatrists who specialize in rural and tele-based treatment.

Resource-Optimization Proponent: Suggests expanding training for existing physicians and nurses to cover general mental health assessment and basic counseling.

13. Home healthcare systems are breaking down due to load-bearing issues by an aging rural population

Aging Population Specialist: Recommends preemptive restructuring of care programs for the elderly to assist with their specific needs.

Tech Pioneer: Proposes using AI, robotics, or telehealth monitoring for seniors to ease the burden on human resources.

14. Growing reliance on large, centralized hospitals at the expense of smaller rural clinics

Proponent of Large Hubs: Will say consolidation of healthcare into bigger, more equipped hospitals is inevitable, focusing on efficient care delivery.

Local-Care Advocate: Will argue the opposite, saying that local healthcare autonomy and decentralized systems will prevent backlogs and maintain quick, individualized care.

15. What should we anticipate to ensure the medical workforce operates fairly and safely with respect to evolving rural healthcare demands, such as working overtime

Labor Rights Advocate: Will push for legislation ensuring worker protections and fair pay policies in rural settings.

Pragmatic Manager: Suggests creative restructuring of shifts and task management, rather than over-legislating the workplace.

Phase 4: Addressing Looming Problems in Rural Healthcare

While many issues, such as access to care and resource shortages, in the world of healthcare have been addressed through technological advancements like telemedicine, there are looming challenges that have yet to be fully recognized. These include future pandemics, the mental health crisis hidden in underserved areas, and a rapidly aging population without sufficient support systems. To navigate these uncertain issues effectively, it is essential to have both a vision for the future and an openness to different mind-sets and ideas. This duality forms the foundation for a healthcare system that can evolve and meet the demands of tomorrow. In view of the need for “forward thinking,” Table 4 presents 15 different “hints of future problems,” issues that may not be today’s concerns but are likely to evolve to concerns in the not-too-distant future. Table 4 also presents the responses of two mind-sets [28-30].

Table 4: Looming problems in rural healthcare as suggested by AI, along with the suggestions of two relevant mind-sets.

1. Workforce Automation & AI Adoption: “As AI and automation take a growing role in healthcare by [FUTURE YEAR], how will specialized programs ensure that rural populations can keep a personal touch with their healthcare providers?”

Hint of Future Problem: Rapid AI and automation might depersonalize healthcare, particularly in rural areas where interpersonal relationships are critical.

Tech-Embracing Mind-set: Focuses on full-scale AI implementation, believing initial depersonalization can be offset by efficiency and improved outcomes.

Patient-Centered Mind-set: Believes AI must be used only as a supplemental tool to maintain human relationships and hands-on care, especially for elderly rural populations.

2. Training Generalists vs. Specialists: “As rural areas generally need generalist practitioners while urban areas can support multiple specialists, how will medical training balance these needs?”

Hint of Future Problem: Increased specialization in medical education could leave rural areas under-equipped with generalist doctors.

Public Health Mind-set: Advocates for hybrid models where specialists are trained to address multiple conditions, especially for underserved areas.

Academic Medical Community Mind-set: Proposes expanding residency programs with more focus on rural specialties, offering incentives for rural placement.

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3. Data Privacy in Telemedicine: “As telemedicine becomes widespread, what measures will be in place to safeguard patient data, especially for remote communities with poor digital infrastructure?”

Hint of Future Problem: With the rapid spread of telemedicine, the vulnerabilities in cybersecurity for rural health networks could pose risks to data privacy.

Tech-First Mind-set: Prioritizes building stronger digital frameworks and continuously innovating in cybersecurity to address evolving threats.

Legal/Ethical Mind-set: Focuses on enforcing stricter data privacy regulations and making sure healthcare professionals are trained to deal with potential breaches.

4. Over-reliance on Telemedicine: “Could an over-reliance on telemedicine overshadow the long-term necessity for in-person engagement and critical hands-on procedures in rural areas?”

Hint of Future Problem: Overuse of telemedicine may lead to gaps in care that require tactile diagnosis or hands-on procedures that cannot be provided remotely.

Telemedicine Advocate: Sees telemedicine as an adequate substitute for most consultations but advocates for mobile healthcare units to fill gaps.

Traditional Healthcare Advocate: Believes telemedicine is a useful supplement but that patients need regularly scheduled in-person doctor visits for quality care.

5. Physician Burnout & Quality of Care: “What proactive measures will be put in place to prevent rural doctors from facing increased burnout as administrative duties increase in a tech-heavy system?”

Hint of Future Problem: The workload associated with digital health record-keeping and bureaucracy may add stress to already overworked rural health professionals.

System Efficiency Mind-set: Argues for improving administrative AI to reduce the burden on healthcare workers.
Work-Life Balance Advocate: Emphasizes reducing doctor admin burdens by hiring more support staff or streamlining tasks without relying too heavily on technology.

6. Healthcare Access for Remote Indigenous Populations: “How do we ensure healthcare access to the most geographically isolated indigenous or minority rural populations, particularly as resources become more centralized?”

Hint of Future Problem: Even with improved healthcare in some rural areas, isolated or geographically extreme areas may still be underserved.

Resource Optimization Mind-set: Suggests mobile health clinics and remote diagnoses handled by centralized hubs.

Cultural Sensitivity Mind-set: Suggests recruiting local indigenous healthcare workers, ensuring systems respect cultural norms and uniqueness.

7. Pharmaceutical Shortages: “With the consolidation of pharmaceutical supply chains, what can ensure rural areas don’t experience drug shortages or delivery delays?”

Hint of Future Problem: Rural populations could face increasing issues accessing essential medicines due to logistics or reduced incentives for pharmaceutical companies.

Supply Chain Innovation Mind-set: Focuses on improving logistics via drone deliveries or 3D printing essential drugs locally.

Healthcare Policy Advocate: Pushes for government intervention in mandating equitable distribution and storage capacities in rural locales.

8. Aging Rural Population-Specific Care: “With the aging rural population increasing, how do we build a health system focused on home-care and aging support, rather than hospital-centric models?”

Hint of Future Problem: An older rural population will have more chronic conditions needing in-home care services instead of hospital-based solutions.

Home Health Advocate: Believes in creating a network of community health workers focused on visiting patients at home.

Institutional Healthcare Advocate: Proposes expanding geriatric wings in rural hospitals, minimizing the need for travel to urban centers.

9. Transportation to Specialized Facilities: “What types of transportation infrastructures will need to exist to support patients who require specialized care outside rural locations?”

Hint of Future Problem: Rural patients needing specialized or emergency treatment may face continued difficulty accessing urban or highly-specialized care centers.

Infrastructure Planning Mind-set: Proposes building better transportation routes, subsidized transit options, and more emergency airlifts.

Local Care Advocacy Mind-set: Argues for expanding local hospitals and capabilities so rural areas don’t need to travel for care.

10. Med-Tech Accessibility: “As medical technology advances, how can we ensure that cutting-edge treatments, devices, and diagnostic tools are accessible to rural patients?”

Hint of Future Problem: Advanced medical technologies, such as robotic surgery or personalized medical devices, may remain too costly or logistically complicated for rural areas.

Med-Tech Innovators: Suggest partnerships with tech companies that offer rural-focused medical solutions at scale.

Insurance & Policy Advocate: Pushes for legislation to make advanced healthcare technologies affordable and accessible throughout the population.

11. Health Literacy: “With the rapid complexity of healthcare data, how can the system ensure that rural individuals have the health literacy to make informed medical decisions?”

Hint of Future Problem: The fast pace of medical innovations may outstrip the ability of rural populations to understand or engage fully in their own healthcare.

Education Advocate: Proposes expanding digital education programs and requiring comprehensive health literacy campaigns in rural schools.

Community Health Worker Mind-set: Pushes for community-based workers to offer personalized health education within local settings.

12. Mental Health Access: “How will we address the rising rates of mental health issues in rural areas, ensuring access to proper psychiatric care, which is usually centralized?”

Hint of Future Problem: Mental health could remain widely underserved in rural areas, especially if a stigma continues against seeking mental health services.

Tele-Psychiatry Advocate: Sees a future where virtual mental health care can handle most rural mental health needs.

In-Person Treatment Advocate: Argues for mobile mental health units or on-site practitioners who address concerns in their community context.

13. Shifting Disease Profiles: “How will primary care providers in rural settings respond to shifting disease profiles due to climate change and demographic changes?”

Hint of Future Problem: Changing climates may introduce or worsen certain diseases, while increased migration or population shifts further complicate healthcare provision.

Climate-Conscious Mind-set: Focuses on strengthening rural healthcare resilience to emerging diseases and warming-driven health challenges.

Preventative Medicine Focus: Advocates for large-scale vaccination or pre-emptive interventions specifically suited for climate-related conditions.

14. Funding Stability: “How can rural healthcare ensure stable and effective funding, especially if advancements in technology drive costs up while rural populations struggle financially?”

Hint of Future Problem: With rising costs in healthcare and slower population growth in rural areas, sustaining a cost-efficient rural healthcare network might be difficult.

Public Funding Advocate: Prioritizes annual subsidies or incentive-based funding from governments to maintain healthcare services in sparse regions.

Market-Based Approach Advocate: Proposes user-paid models or healthcare memberships, tied to private insurance incentives, as a route to efficiency.

15. Rural Healthcare Retention: “How can we incentivize top-tier medical talent to stay long-term in rural areas, rather than acting as ‘revolving-door’ professionals who only serve short stints?”

Hint of Future Problem: Incentives alone might not suffice to retain highly skilled workers in rural areas, leading to turnover and lower-quality care.

Financial Incentive Focus: Believes loan forgiveness, financial bonuses, and other monetary incentives will solve the issue.

Community Integration Focus: Argues for building strong community bonds, where healthcare professionals develop deeper ties beyond financial incentives for long-term retention.

Discussion and Conclusion

Challenges, like scarcity of medical resources and lack of technological infrastructure, can often feel insurmountable, but innovative strategies, such as generative AI, can pave the way for impactful solutions. AI and Mind Genomics can revolutionize healthcare by transforming the way healthcare is delivered and experienced in rural areas. AI can analyze vast amounts of data, generate novel insights, and expose hidden problems. This approach can supercharge traditional methods and offer holistic strategies to transform healthcare delivery and experience.

The traditional approach of dissecting complex problems into hyper-targeted research questions is insufficient for addressing multilayered issues like those faced by rural healthcare providers. The marriage of Mind Genomics with AI allows for real-time, interdisciplinary problem-solving, transforming information overload into actionable solutions. AI can sift through data, identify patterns, frame potential solutions, and evolve based on real-time outcomes and suggestions.

AI's potential as a change agent in rural health care is even more apparent when viewed through the paradigm of systems thinking. It can integrate variables from multiple domains, including social, geographical, and infrastructural contexts, offering a panoramic view of healthcare challenges. This approach can also enhance collective thought and creativity, promoting deeper levels of thinking and fostering a broader conversation about how collaboration with machines will redefine interdisciplinary problem-solving.

However, the ultimate outcomes of AI collaboration will be shaped by human intention and intuition. Traditionalists must embrace this new era of inquiry and innovation, while the true value of AI and Mind Genomics lies in how we choose to harness these tools to serve the greater collective need.

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1. ChatGPT 3.5 - to create the information
2. QuillBot - to help polish the answers

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