National Rural Health Association Policy Brief

Artificial intelligence in rural health care: A policy roadmap for ensuring ethical and equitable usage and closing gaps in access

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Introduction

Artificial intelligence (AI) is a rapidly evolving field within computer science focused on the development of systems designed to replicate human cognitive processes such as learning, decision-making, and problem solving with minimal human intervention.[1,2] Rather than a monolithic technology, AI encompasses complementary and diverse computational approaches with distinct capabilities and implementation considerations for rural health care settings. Generative AI and large language models support clinical documentation, diagnostic support tools, automated documentation systems, electronic health records (EHRs), and patient communication. Machine learning algorithms enable predictive algorithms for remote patient monitoring (RPM) and chronic disease pattern recognition. Traditional decision trees or expert systems may offer greater interpretability and lower computational requirements for resource planning.[2,3] For example, AI-driven RPM systems have effectively managed chronic diseases such as diabetes, cardiovascular conditions, and cancer in rural areas, providing continuous monitoring and timely interventions through wearable devices and mobile applications. [3]

These diverse AI techniques have different data requirements, computational needs, and regulatory considerations that may directly impact the feasibility and adoption of policy recommendations in rural health care environments. While these advances offer considerable promise, the adoption of AI in health care also raises critical concerns. Issues of data quality, limited training data, user privacy, accessibility, ethical and legal questions, and community engagement all present challenges to widespread implementation. In rural areas in particular, where health care systems face unique barriers including limited infrastructure, workforce shortages, geographical isolation, and longer patient access times, AI could help bridge gaps in access and quality of care.[4] Frequent rural hospital closures and persistent health care workforce shortages further underscore the necessity of adopting AI-driven solutions, which can streamline health care delivery, enhance diagnostic precision, and ensure continuous care.[5–7]

To effectively deploy and promote AI-driven health care tools in rural areas, it is critical to address potential biases, ensure strong data security, and promote transparency and interpretability of AI systems.[8,9] Federal initiatives such as the National Institutes of Health's Bridge2AI program and telehealth projects supported by the Health Resources and Services Administration (HRSA) exemplify current governmental efforts to integrate AI within rural health care, aiming to improve access and health outcomes for underserved populations.[10,11]

Analysis

Challenges and opportunities

Several challenges hinder the widespread adoption of AI in rural health care. These include:

- **Data limitations:** AI models rely heavily on large, high-quality datasets, but rural health care data is often sparse, inconsistent, and siloed across institutions. Many rural hospitals also lack EHR interoperability, limiting effective data sharing. Rural populations — often older and medically complex — remain underrepresented, leading to potential bias and reduced model performance in rural settings.[12]

- **Modeling rural realities:** Many AI tools are optimized for urban workflows and may not align with rural care delivery's scale, pace, and structure. This disconnect can reduce their relevance or safety in small clinics and decentralized care networks.[8,13] Developing AI models tailored to the needs of individual rural providers would require significant financial and workforce investments — resources that rural health care systems typically lack.[12]
- **Limited tool accessibility:** Rural areas often face digital infrastructure barriers, including limited broadband access, poor broadband quality and speed, outdated hardware, and insufficient IT staffing.[12,14] According to the FCC's 2020 Broadband Deployment Report, rural Americans continue to lag behind their urban counterparts in high-speed internet access, with especially low coverage in Tribal and remote areas.[15] Constrained access can also drive reliance on consumer-grade AI for medical advice, risking unvalidated guidance, privacy violations on non-HIPAA-compliant platforms, and inadvertent contribution of sensitive narratives to commercial training datasets.[16]
- **Ethical and legal concerns:** Questions about who is accountable and liable if an AI-influenced decision harms a patient remain largely unresolved.[17] These concerns are more acute in rural settings, where access to legal counsel, institutional review boards, and data governance infrastructure is limited.[18] Importantly, AI tools are not a substitute for clinical judgement but function as decision-support components within broader clinical, organizational, and regulatory systems, requiring clear human oversight and responsibility. Regulatory gray areas persist around how interaction data used to train AI is collected, retained, and repurposed compared with traditional medical data.
- **Workforce readiness:** Effective AI implementation requires a prepared workforce, but rural areas face limited training opportunities, technical support shortages, and an aging clinical workforce. These constraints hinder AI integration, especially in settings where staff already play multiple roles.[4]
- **Community acceptance:** Rural residents may hesitate to trust opaque "black box" algorithms.[8] Concerns about automation, surveillance, job displacement, and low digital literacy can reduce trust. Community-based engagement and participatory design approaches are needed to build transparency and acceptance.[19,20]
- **Environmental and infrastructure risks:** Resource-heavy AI infrastructure such as data centers may be placed in rural areas, bringing jobs but also competing for local water and energy supplies.[21] Additionally, rural IT support remains limited, raising cybersecurity concerns.[12] The environmental footprint of AI, including high electricity consumption, increased carbon emissions from data processing, and e-waste from rapid hardware turnover, poses long-term sustainability challenges that must be considered in rural planning and policy development.[22]

These challenges also present opportunities to develop AI solutions tailored to rural health care needs.

- **Reducing provider burnout:** AI-enabled EHRs and ambient clinical intelligence technologies such as automated documentation and clinical summarization can help reduce administrative workload and cognitive fatigue, allowing rural clinicians to spend more time with patients.[23]
- **Scaling telehealth:** AI-enhanced telehealth platforms can offer clinical decision support, real-time analytics, and improved triage protocols, enhancing rural patient access to specialists.[3]
- **Earlier diagnosis and reducing errors:** Predictive models can flag early signs of deterioration or emerging health risks in remote patients, enabling preemptive outreach by rural providers.[24] AI tools have shown promise in increasing diagnostic accuracy, particularly in radiology, dermatology, and ophthalmology — specialties with limited access in rural settings. Studies have

demonstrated AI's ability to detect skin cancer and diabetic retinopathy, with performance being on par with that of medical experts.[25,26]

- **Rural resource planning:** AI can support rural health administrators by predicting service utilization, managing workforce scheduling, and prioritizing emergency response — critical tasks in settings with thin operating margins and workforce shortages.[27]
- **Community-level outreach:** AI-powered analytics can guide mobile health programs and local health workers to target outreach efforts where needs are most significant, whether identifying high-risk households or tailoring services to isolated populations.[19]
- **Chronic care support:** In partnership with the local rural primary care provider, virtual health companions such as digital twin technologies can help rural residents monitor chronic conditions by simulating treatment options and promoting personalized self-management strategies.[28]
- **Fraud prevention:** AI can help insurance companies and payors detect unusual or suspicious patterns in claims, enabling timely interventions.[29] These may include conducting vulnerability analyses, initiating referrals to law enforcement, implementing administrative actions, or updating relevant policies and regulations to reduce future risk.[30]

The convergence of these challenges and opportunities underscores the critical need for thoughtful policy responses that ensure AI tools are available, appropriate, and beneficial to all rural populations, particularly those historically underserved or overlooked.

Policy context

Current federal, state, and local policy landscapes reveal a fragmented yet evolving approach to integrating AI in rural health care delivery. While key federal agencies have signaled support for innovation and equitable access, gaps in regulation, infrastructure, and oversight must be addressed to ensure effective and ethical AI adoption in rural health care and communities.

Federal policy landscape

Recent federal developments reflect momentum and complexity in integrating AI into rural health care systems. While national strategies emphasize innovation and infrastructure, gaps remain in regulatory oversight, implementation support, and rural-specific considerations.

- **National strategy and regulatory shifts:** In early 2025, the Trump administration issued Executive Orders 14148 and 14179.[31,32] These orders repealed prior regulatory frameworks and introduced a new national AI strategy focused on innovation, security, and global competitiveness. This innovation-first approach encourages private-sector growth but leaves open questions about ethical safeguards, particularly for vulnerable rural communities. The absence of explicit rural-focused guardrails or accountability mechanisms underscores the need for complementary oversight at the agency level.
- **Health and Human Services and rural-focused innovation:** The U.S. Department of Health and Human Services (HHS) has advanced a more targeted, rural-sensitive approach. The HHS Strategic Plan for AI prioritizes rural health through AI-enabled mobile clinics, health monitoring tools, and workforce development.[11] This approach aligns with broader federal initiatives led by HRSA, which has expanded telehealth infrastructure through programs like the Telehealth Broadband Pilot and the Telehealth Resource Centers.[33] CMS's new ACCESS (Advancing Chronic Care with Effective, Scalable Solutions) Model tests an outcome-aligned, value-based payment approach in Original Medicare to expand access to technology-supported services for chronic disease prevention and management.[34] These programs collectively support rural readiness for AI-enabled services but require continued funding, clearer CMS guidance on coding and

reimbursement pathways, stronger coordination across federal entities, and local input for effectiveness.

- **Infrastructure and broadband investments:** Reliable broadband access remains a prerequisite for rural AI adoption. The Federal Communications Commission (FCC) has taken important steps through the Connected Care Pilot Program and COVID-19 Telehealth Program by expanding telehealth infrastructure in underserved areas. However, ongoing rural broadband investment is needed to address persistent connectivity gaps that limit AI implementation.
- **Scientific integrity and ethical boundaries:** Federal science agencies such as the National Science Foundation, National Institutes of Health (NIH), and Department of Energy have issued guidance reinforcing the boundaries between AI assistance and human authorship in scientific research.[35–37] These standards emphasize the importance of transparency, accountability, and human oversight, which are equally critical in clinical decision-making.
- **Governance and public input:** The Office of Management and Budget mandates transparency and accountability for AI in federal operations, principles that should extend to clinical decision-making in rural health care delivery.[38] Meanwhile, the White House Office of Science and Technology Policy's 2025 Request for Information represents a critical opportunity for rural stakeholders to influence the forthcoming national AI Action Plan, particularly around cybersecurity, workforce preparation, data interoperability, and procurement strategies tailored to rural health systems.[39]

State policy changes

State governments are beginning to establish regulatory guardrails around AI use in health care, primarily focusing on transparency, clinical oversight, and patient protection. Notably, California has enacted legislation that could serve as a model for rural health safeguards. Assembly Bill 3030 mandates that AI-generated health communications include clear disclaimers ensuring patients are aware when a human has not directly authored clinical information.[40] Senate Bill 1120 further prohibits the exclusive use of AI in utilization review processes and requires licensed physicians to make final determinations on medical necessity.[41] These measures help preserve clinical integrity and protect patients' rights, which are essential in rural areas where individuals may already face systemic barriers to health care access.

Other states like New York are developing frameworks around AI transparency, data governance, and algorithmic accountability.[42] However, few explicitly consider the infrastructure constraints, provider shortages, and care delivery challenges unique to rural health systems. This indicates a policy gap and an opportunity for more intentional, rural-focused state legislation.

Local policy context

At the local level, AI integration into health care remains uneven and largely dependent on institutional leadership, regional partnerships, and available resources. Some rural health departments and clinics participate in pilot programs with universities, technology companies, or philanthropic organizations to explore AI applications in service delivery. However, these efforts often remain fragmented and difficult to sustain or scale without consistent policy guidance or dedicated funding.

Local capacity building is essential to ensure AI technologies are implemented responsibly and with community buy-in. This includes providing technical assistance, supporting digital literacy among providers and patients, and developing governance models that reflect the values and needs of rural communities.

The current federal, state, and local policy landscapes reveal both progress and fragmentation in guiding AI adoption in rural health care. While federal initiatives have laid a foundation for innovation and infrastructure, rural-specific needs remain under-addressed, leaving critical gaps in oversight, coordination, and ethical safeguards. State-level efforts have begun to set important precedents for patient protection and transparency; however, these policies often lack explicit rural considerations. At the local level, promising pilot programs remain uneven and difficult to sustain without dedicated policy support. Taken together, these trends highlight the need for updated, comprehensive policy frameworks that move beyond piecemeal approaches and directly address the unique challenges of rural communities. Updating policy is therefore essential not only to ensure safe, equitable, and effective AI integration in rural health care delivery but also to secure long-term sustainability and trust in these rapidly evolving technologies.

Policy recommendations

A multi-level policy strategy — federal regulation, state oversight, and local implementation — is essential to unlock AI's full potential while minimizing harm. Tailoring these efforts to the needs of rural suppliers, users, educators, and practitioners will help ensure AI advances health care access, quality, and trust in underserved communities.

National-level recommendations

1. **Strengthen oversight of AI-enabled medical devices and autonomous health technologies (suppliers & infrastructure)**
    - Provide stronger federal oversight to prevent substandard products from entering rural markets, where facilities like critical access hospitals (CAHs) and rural health clinics (RHCs) often have limited capacity for rigorous evaluation. While the U.S. Food and Drug Administration (FDA) has issued guidance on adaptive AI and machine learning in medical devices, these recommendations remain non-binding.[43]
    - Establish mandatory standards for development, validation, quality assurance, and marketing of AI-enabled medical devices. Clarify the boundaries of the shared responsibility between hospitals (including CAHs), clinicians, and manufacturers and minimize the malpractice risk and legal uncertainty.
    - Create a dedicated regulatory coordination office within HHS to align related activities by FDA, CMS, NIH, and other federal oversight agencies.[44]
    - Incentivize vendors to validate AI-enabled tools such as driverless ambulances and mobile diagnostic units in rural and low-resource populations, addressing risks of algorithmic bias and performance disparities.[45]

2. **Expand federal investment in workforce training and digital infrastructure (users & workforce)**
    - Increase HRSA and Department of Labor funding for AI literacy and upskilling programs tailored to rural clinicians, CAHs, RHCs, and IT personnel.
    - Incentivize credentialing pathways, continuing education, and micro-credentials for AI integration across clinical workflows.
    - Continue broadband and device expansion via the FCC and USDA to close connectivity gaps that limit rural AI adoption.

3. **Advance ethical and evidence-based AI research (education/research)**[46]
   - Fund research focused on evaluating AI in rural health care contexts, including community-based participatory models.
   - Fund and require participation in rural-inclusive data sharing initiatives that create national de-identified training datasets with diverse geographic and demographic representation to ensure training accessibility.
   - Encourage interdisciplinary collaborations on AI's environmental footprint, especially in resource-limited settings.
   - Invest in sustainable AI research that prioritizes low-energy models and greener data centers serving rural health care networks.

4. **Establish national AI standards in health (oversight & policy leadership)**
   - Through the HHS Office of the National Coordinator for Health Information Technology, establish enforceable guidelines for data sharing, transparency, algorithm explainability, and accountability aligned with principles from the National Academy of Medicine and other governance frameworks to support trustworthy AI development.[47]
   - Make funding for operational AI systems contingent on compliance with national and state guidelines, participation in data sharing initiatives, and demonstration of evidence-based efficacy.
   - Engage rural voices in national policy planning efforts such as the forthcoming National AI Action Plan by issuing targeted rural stakeholder requests for information and focus groups.[45]
   - Fund national plain-language public education on safe AI use for health decisions with rural-tailored messaging.
   - Incentivize the building of "green AI" data centers in rural communities for training and inference.[9]

State-level recommendations

1. **Enact protections for rural patients and clinicians (oversight & users)**
   - Implement legislation requiring human oversight in medical decision-making and clear disclaimers for AI-generated communications similar to California's AB 3030 and SB 1120.
   - Require AI tools reimbursed by Medicaid or listed in state insurance formularies to be independently validated for safety, transparency, and rural applicability.
   - Align new funding streams such as the Rural Health Transformation Program with technology modernization and AI readiness activities.[48,49]

2. **Support rural AI workforce development through public institutions (education & workforce)**
   - Partner with community colleges and state universities to develop AI certificate programs for health professionals, with targeted outreach to rural practitioners.
   - Provide state grants to assist rural hospitals and CAHs in acquiring AI-compatible EHR systems and diagnostics infrastructure.
   - Incentivize program training on "green AI" practices to reduce the environmental costs of AI tools.

3. **Fund regional AI implementation pilots (suppliers & practitioners)**
   - Allocate funds for pilot programs that evaluate AI tool integration in rural clinical workflows.
   - Offer technical assistance and regional learning collaboratives to share lessons across counties and local health jurisdictions.

Local-level recommendations

1. **Build local capacity for ethical AI implementation (practitioners & oversight)**[50]
   - Develop governance frameworks in local institutions that reflect community values and build trust in AI. Have rural hospitals, clinics, and health systems as leaders in this effort by forming cross-functional AI review boards that include patient advocates, providers, and IT specialists.
   - Training clinical and administrative leaders in procurement, tool vetting, and legal liability will be essential, particularly as AI-supported decision-making becomes more prevalent.
   - Encourage local collaboration to adopt low-resource, energy-efficient AI tools designed for rural environments.

2. **Increase community engagement to improve AI acceptance (users & practitioners)**
   - Implement local listening sessions and participatory design workshops to address trust, digital literacy, and cultural concerns related to AI.[51]
   - Partner with trusted community health workers to help explain AI-enabled care tools to patients in plain language. [52]

3. **Leverage local-regional partnership (education & research)**
   - Encourage partnerships between local hospitals, clinics, and nearby universities or tech incubators to co-develop rural-relevant AI tools and share infrastructure.
   - Incorporate AI risk and benefit education into local continuing medical education (CME) offerings and clinical simulation trainings.

Recommended actions

AI holds transformative potential for rural health care, enhancing diagnostic accuracy, streamlining workflows, and addressing workforce shortages. Yet realizing this potential requires more than innovation alone; it demands strategic, coordinated investment in infrastructure, workforce, governance, and financing mechanisms. The following actions outline a rural AI readiness framework grounded in five critical pillars:

Infrastructure investment

- *Broadband & connectivity:* Reliable broadband is foundational for AI adoption in rural settings, enabling telemedicine, real-time diagnostics, and cloud-based analytics. However, many rural communities remain under-connected.
  - Recommended action: Expand federal and state investment in rural broadband infrastructure through alignment with USDA's ReConnect Program and NTIA's Broadband Equity, Access, and Deployment initiative.

- *Hardware & software upgrades:* Rural facilities often operate with aging IT systems and lack AI-ready platforms.
  - Recommended action: To modernize clinical infrastructure, offer capital improvement grants and equipment subsidies through HRSA and other rural health initiatives.

- *Autonomous health technologies:* Emerging technologies such as autonomous ambulances present new options to address rural transportation and emergency care gaps.
  - Recommended action: Fund pilot programs to test autonomous vehicles and mobile diagnostic units in rural settings using DOT, HHS, or cross-sectoral innovation grants.

Workforce development and training

- *AI literacy and technical skills:* Effective AI use requires provider training in interpretation, ethics, and bias mitigation.
    - Recommended action: Support continuing education, certifications, and CME modules for rural clinicians through area health education centers (AHEC) and regional medical colleges.

- *Recruitment and retention of AI talent:* Rural areas face chronic shortages of data scientists and IT specialists.
    - Recommended action: Establish rural AI fellowships and loan repayment programs to incentivize data and tech professionals to work in underserved regions.

Programmatic support

- *Pilot projects and demonstration programs:* Rural-specific pilots allow AI solutions to be tested in real-world contexts with local input.
    - Recommended action: Use CMS Innovation Center funding to support AI pilot programs co-developed with academic medical centers.
    - Recommended action: Establish Rural AI Centers of Excellence through HRSA or USDA rural development grants to serve as hubs for research, training, and best practices.

- *Public-private partnerships:* Collaborations between rural providers and tech developers can yield tailored AI solutions.
    - Recommended action: Create seed grant programs and tax incentives to foster PPPs to advance rural health equity through AI.

Data governance and safeguards

- *Secure data infrastructure:* To protect sensitive health information, especially in under-resourced rural facilities, data systems must include strong safeguards to ensure compliance with HIPAA, cybersecurity standards, and responsible data stewardship.
    - Recommended action: Fund the development of rural health information exchanges and offer technical assistance on cybersecurity and HIPAA compliance.

- *Bias mitigation and inclusive AI development:* AI tools trained on non-representative data can perpetuate or worsen disparities.
    - Recommended action: Establish federal safeguards requiring inclusive training datasets that reflect rural population health realities.
    - Recommended action: Create research funding mechanisms to support inclusive, de-identified rural data collection and algorithm training.

Sustainable financing and legal safeguards

- *Reimbursement and liability considerations:* For AI integration to succeed in rural settings, safeguards must extend to ethical, financial, and legal domains. Lack of reimbursement and unclear liability guidelines pose risks to patients and providers.
    - Recommended action: Advocate for Medicare and Medicaid reimbursement codes that cover AI-supported services, including remote monitoring, predictive analytics, and diagnostic support.

- Recommended action: Ensure reimbursement parity for AI-assisted care across rural and urban settings while addressing ethical considerations such as data security, patient safety, outcome validation, and provider liability.

Integrating AI into rural health care offers transformative potential – but only if accompanied by coordinated investments in infrastructure, workforce, program development, data governance, and reimbursement policy reform. Rural communities must be part of national AI strategies from the outset—not as afterthoughts, but as innovation leaders and partners in shaping the future of health care.

Conclusion

AI holds significant potential to improve rural health care by addressing long-standing challenges such as workforce shortages, geographic isolation, and gaps in access to care. Applications like remote patient monitoring, clinical decision support, and tailored chronic disease management offer promising tools to strengthen health care delivery in rural settings. However, the benefits of AI are not guaranteed, and if not thoughtfully implemented these technologies could unintentionally widen the divide between rural and urban health systems.

Ensuring that AI benefits all communities requires coordinated action across federal, state, and local levels. Infrastructure upgrades, workforce training, and sustainable financing mechanisms must be paired with strong standards for data quality, oversight, and safety. Just as importantly, rural communities must be meaningfully involved in shaping how these tools are developed and deployed. Achieving meaningful and sustainable integration will require community engagement, strong local leadership, and technology that is responsive to the social, cultural, and logistical context of rural health care delivery.

With inclusive planning and shared commitment, AI can strengthen health care systems and improve outcomes in rural areas. However, responsible deployment requires continuous monitoring, periodic reassessment, and adaptive recommendations as technologies, policies, and community needs evolve. Now is the time for decisive, collaborative action to ensure the advances in AI technology reach every corner of our health care system, including those too often left behind.

Acknowledgments

We would like to express our gratitude to NRHA's Rural Health Policy Congress and staff, including Carrie Cochran-McClain, Whitney Zahnd, and Trent Bourland, for their valuable reviews and insightful feedback. Their input has greatly enriched the quality of this work. However, we take full responsibility for any errors or interpretations presented in the policy brief.

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