

UT DALLAS AIMD

AI in Medicine Case Competition

**Bridging the Gap: Artificial Intelligence and Access
to Primary & Preventive Care in Underserved
America**

Case Document 2026

Introduction

Dr. Amara Bell runs a small family medicine practice in Holcombe County, a rural stretch of the Mississippi Delta three counties removed from the nearest hospital with a labor and delivery unit. Her patient panel skews older, poorer, and sicker than the national average, and on any given morning her waiting room holds a mix of uninsured farmworkers, Medicaid-covered retirees, and a handful of patients who drive ninety minutes each way because the clinic closer to home shut its doors two years ago.

Today's first appointment is with Marcus Webb, a 58-year-old former warehouse worker who lost his employer-sponsored coverage after a layoff and now relies on the county's sliding-fee community health center. Marcus has type 2 diabetes and hypertension, but his last hemoglobin A1c test was over fourteen months ago; the nearest lab that draws same-day blood work is forty-five minutes away, and Marcus does not own a reliable car. He tells Dr. Bell he has been rationing his metformin to make the prescription last, a habit she suspects is common among her patients but rarely hears about until a crisis forces the conversation.

Dr. Bell knows Marcus is not an outlier. Nearly a quarter of the U.S. population now lives in or near a federally designated primary care shortage area, and the number of these shortage areas has climbed sharply in the past year alone, now covering more than ninety million Americans.⁽¹⁾ Nationally, the government projects a shortage of over seventy thousand full-time primary care physicians within the next decade, a gap that falls hardest on rural counties, low-income urban neighborhoods, and communities of color.⁽²⁾ For patients like Marcus, this shortage does not appear as an abstract statistic; it appears as a missed screening, a delayed diagnosis, or a hospitalization that earlier, more consistent care could have prevented.

Down the hall, Dr. Bell's colleague is finishing a telehealth visit with a patient sixty miles away, a visit made possible only because the patient's daughter drove to a McDonald's parking lot to borrow the WiFi. Broadband remains far from universal in rural America, and even where connections exist, older patients and those with limited digital literacy often struggle to use the video platforms that clinics have adopted since the pandemic.^(11,12) Dr. Bell has started to hear more about artificial intelligence tools that promise to help — AI-assisted triage lines, remote monitoring devices that flag a dangerous blood pressure reading before it becomes an emergency room visit, algorithms that comb through claims data to find patients overdue for a colonoscopy or mammogram. She is cautiously hopeful. She has also read enough to know that a pulse oximeter, a device in nearly every exam room in America, has long been documented to overestimate blood oxygen levels in patients with darker skin, a flaw that has followed the device into some of the very algorithms marketed as solutions to care gaps.⁽⁴⁾ Technology built without her patients in mind, she worries, could just as easily widen the gap it claims to close.

Back at her desk between visits, Dr. Bell reflects on the shape of the problem: an aging, increasingly chronically ill population; a primary care workforce that is not growing fast enough to meet it; a rural health system where hospitals and obstetric units are closing at a pace not seen in years; and a wave of new technology that could either extend her reach or bypass the patients who need her most.⁽⁵⁾ She

has started attending regional health IT briefings, hoping to find a vendor, a pilot program, or a policy idea that treats access and equity as the starting point of design rather than an afterthought. In April 2027, thousands of clinicians, hospital executives, technologists, and policymakers will gather in Chicago for the HIMSS Global Health Conference & Exhibition — the world's largest health information technology gathering — to showcase exactly these kinds of innovations.(20) Dr. Bell is planning to attend, hoping that somewhere on the exhibition floor is a solution that could reach patients like Marcus.

Dr. Bell's experience illustrates one example of the challenges facing underserved communities. Teams are encouraged to explore access barriers affecting other populations and regions across the United States.

Your Task Is...

Your task is to design a multifaceted solution that uses artificial intelligence, alongside any complementary technologies, programs, or policies you deem necessary, to expand access to primary and preventive health care for an underserved population within the United States. Your proposal will be presented at HIMSS27, the 2027 HIMSS Global Health Conference & Exhibition in Chicago, Illinois, to a panel of judges representing public health officials, health-tech investors, and community health leaders.

A coalition of federal and philanthropic partners, modeled on real programs such as HRSA's Health Center Program and value-based innovation grants administered through the Centers for Medicare & Medicaid Services (CMS), is offering \$5 million USD to fund a five-year pilot of your proposed solution in one U.S. Census region. By the end of the five-year pilot, your project should be positioned for feasible scale-up beyond the chosen region.

The central objective of this challenge is to improve access to primary and preventive health care, rather than solely improving clinical outcomes. Teams should demonstrate how their solution reduces barriers to receiving care, such as geographic distance, provider shortages, financial limitations, or delayed screening and follow-up. Improvements in health outcomes are encouraged but should be connected to meaningful improvements in access.

Your proposal should meet the following criteria:

- Focuses on one of the four U.S. Census Bureau regions (Northeast, Midwest, South, or West) and identifies a specific underserved population within that region. Teams should justify their selection using relevant demographic, geographic, or health care access data.
- Uses artificial intelligence as a core component of the solution — this may include (but is not limited to) predictive analytics, computer-vision diagnostics, natural language processing, AI-enabled remote patient monitoring, or AI-assisted triage and scheduling.
- Targets improved access to primary and/or preventive care, including chronic disease screening and management, vaccinations, maternal and infant health, behavioral health integration, or early cancer detection. Solutions involving specialized or emergency care should demonstrate a clear connection to improving access to primary or preventive services for underserved populations.
- Defines measurable outcomes to evaluate the solution's impact on health care access, quality, and equity. Teams should identify relevant success metrics and explain how progress will be assessed throughout the five-year pilot.
- Includes a detailed five-year implementation timeline.
- Demonstrates long-term financial and operational sustainability beyond the initial five-year funding period, including potential funding or reimbursement mechanisms, and outlines a feasible pathway for scaling the solution to other underserved communities across the United States.
- Includes an itemized budget within \$5 million USD, allocated over five years.
- Addresses region-specific ethical, cultural, regulatory, and community concerns, including algorithmic bias, data privacy, digital literacy, and the digital divide.

Deliverables Requirements

Preliminaries Deliverables

- A 5-minute video presentation that encompasses the major points of your solution and how it addresses each criterion listed in the case prompt. A basic timeline of implementation should be included to demonstrate feasibility. A budget overview is required, but itemization is not needed at this stage. All team members should present part of the solution. All team member names and team number should appear on the title slide.
- A one-page executive summary describing your team's health action plan.
 - Format: Times New Roman, double-spaced, 12 pt.
 - Include all team member names and your team number.
- Your video should be uploaded to YouTube as unlisted. A link to the video and a file of your executive summary must be submitted through the official submission form by 11:59 PM on 10/23/26. Only one member per team should submit. Semifinalist results will be announced on the morning of 10/24/26. Semifinalists will present in person on 10/25/26 in the Finals Round.

Finals Round Deliverables

- A 6-minute presentation that expands on the solution presented in the preliminaries round, including an itemized budget, a detailed timeline of tasks, sources, and a scalability plan. There is no slide limit; teams that exceed the time limit will be stopped and judged on what has been presented.
- A 4-minute judges' Q&A period. Every team member should be prepared to answer questions; no single member may answer all questions.
- Presentation submission details will be emailed to advancing teams prior to competition day.

Evaluation Criteria

Proposals will be evaluated on:

- **Problem & Relevance:** Clear identification of the underserved population and barriers to care.
- **AI Innovation:** Meaningful use of AI to address the identified problem.
- **Feasibility:** Realistic five-year timeline, budget, and implementation strategy.
- **Health Equity & Ethics:** Consideration of accessibility, bias, privacy, and patient safety.
- **Impact & Sustainability:** Measurable improvements in access, long-term viability, and scalability.
- **Presentation:** Clear, organized, and compelling communication of the solution.

Failure to adhere to time limits or other instructions may be grounds for elimination from the competition. Please communicate any submission issues ahead of the deadline.

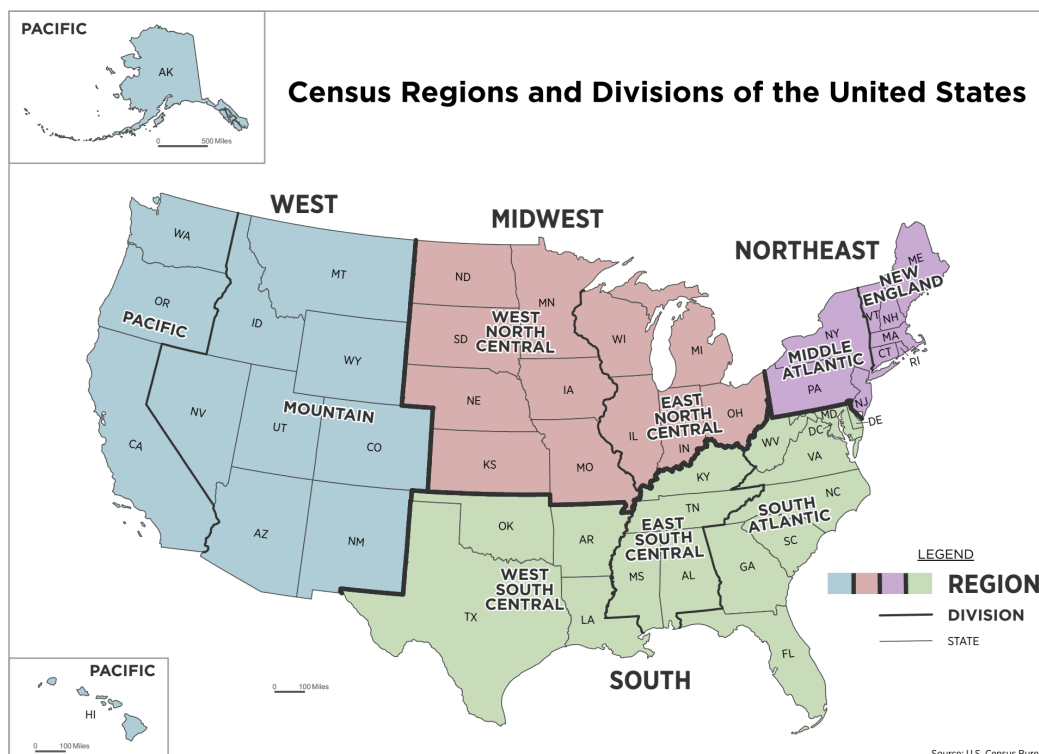
Disclaimer: While the characters described within this case are fictional, HIMSS27 and the underlying health access and technology issues reflect ongoing, real problems. Teams must responsibly justify all data they use to be accurate and valid.

America at a Glance

Regions & Demographics

The U.S. Census Bureau divides the country into four statistical regions — Northeast, Midwest, South, and West — which are further subdivided into nine divisions (Figure 1).(7,21) Your proposal will focus on one of these four regions, with the option to scale to others beyond the five-year pilot if proven feasible.

Figure 1. Census regions and divisions of the United States.(21)



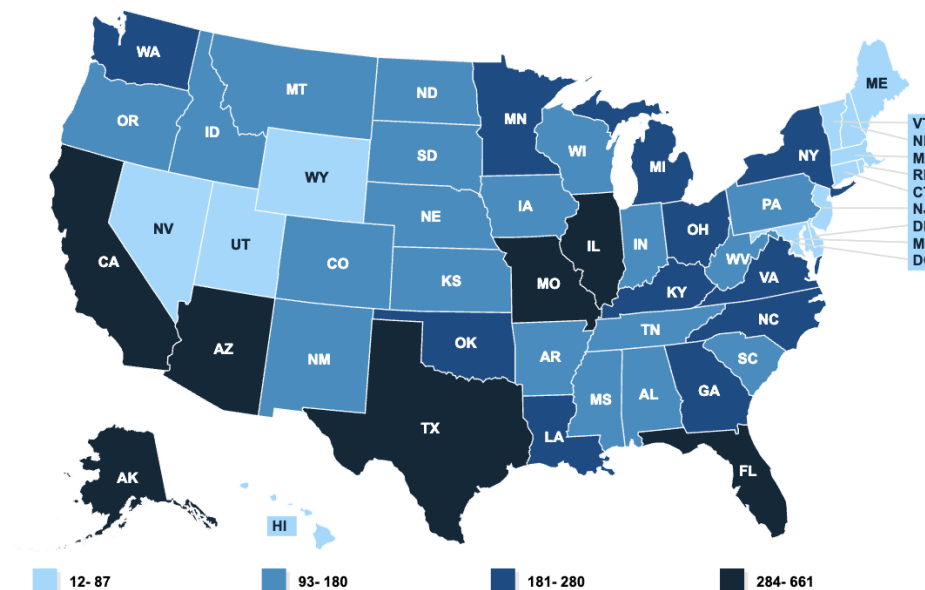
Source: U.S. Census Bureau, Geography Division.

Table 1. U.S. Census regions, approximate population, and general health-access characteristics.(7)

Region	Approx. Population	Key Access Characteristics
Northeast	~57 million	Dense urban health systems; pockets of rural shortage in northern New England and Appalachia
Midwest	~69 million	Aging farm communities; high concentration of critical-access and at-risk rural hospitals
South	~130 million	Largest and fastest-growing region; highest concentration of primary care HPSAs and non-expansion Medicaid states
West	~79 million	Frontier and tribal geography; extreme travel distances; significant broadband gaps outside coastal metros

The United States is home to the highest number of Americans ever recorded living within a designated primary care shortage area — over 92 million people as of the most recent HRSA report, up from roughly 76 million the year before.(1) Shortage designations are not evenly distributed: they concentrate heavily in the rural South and Mountain West, though pockets of urban shortage persist in the Northeast and Midwest as well, often overlapping with historically underinvested and formerly redlined neighborhoods.(1,16) Figure 2 shows the number of primary care shortage designations in each state.

Figure 2. Total primary care Health Professional Shortage Area (HPSA) designations by state, as of December 31, 2025.(22)



Note: Shading shows the number of designations in each state (legend ranges: 12–87, 93–180, 181–280, 284–661), not the share of the population affected. Source: KFF analysis of HRSA Bureau of Health Workforce, Designated HPSA Quarterly Summary.

Geography & the Rural-Urban Divide

The United States spans roughly 3.8 million square miles across widely varying terrain, from the dense urban corridors of the Northeast to the frontier counties of the Mountain West, where a single county can be larger than several New England states combined. This geographic scale creates enormous disparities in how far a patient must travel to reach a primary care provider, a specialist, or a hospital with obstetric or emergency services.

Since 2010, more than one hundred rural hospitals have closed nationwide, and the pace of closures and service reductions has accelerated in recent years; nearly a third of rural hospitals operated at a financial loss in 2024 and 2025 alone, and hundreds more are considered at risk of closing.(5,8) Labor and delivery services have been especially hard-hit: over one hundred rural hospitals have ended obstetric care since the end of 2020, and today fewer than half of the nation's rural hospitals still offer delivery services, leaving many rural counties as full-fledged maternity care deserts.(5,6) Where a hospital closes,

primary and preventive care access typically erodes alongside it, as the surrounding health care workforce and referral network contract as well.

Economic Landscape of Health Care

The United States spends more per capita on health care than any other high-income country, with national health expenditures now exceeding \$5.3 trillion annually, yet outcomes for chronic disease management, maternal mortality, and preventable hospitalizations often lag behind peer nations, particularly for low-income and rural populations.(18) Much of this spending is concentrated on late-stage or emergency treatment rather than the primary and preventive care that could reduce the need for it in the first place — a dynamic your proposal should work to shift.

The U.S. Health Care System

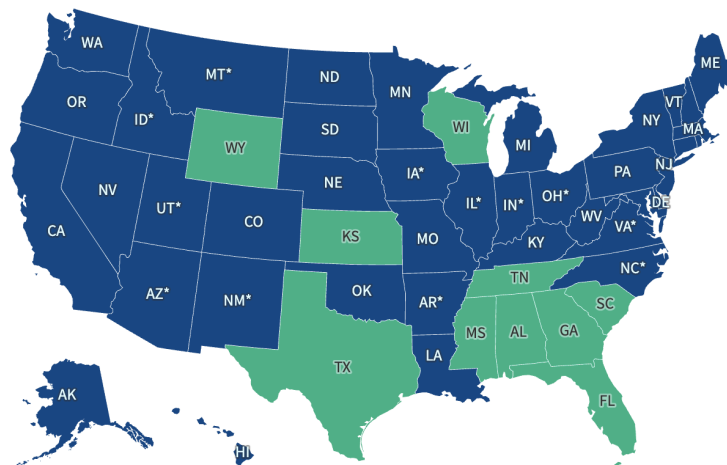
Government Role & the Insurance Landscape

U.S. health coverage is fragmented across public and private payers: employer-sponsored insurance, Medicare (for those 65 and older or with qualifying disabilities), Medicaid (a joint federal-state program for low-income individuals, with eligibility varying significantly by state), Affordable Care Act marketplace plans, and a persistent population of uninsured Americans. States that have not expanded Medicaid eligibility under the ACA tend to have higher uninsured rates and worse chronic disease outcomes, and non-expansion states are disproportionately concentrated in the South, the same region carrying the largest share of primary care shortage areas (Figure 3; compare with Figure 2).(1,23) This patchwork creates sharp discontinuities in who can access consistent primary and preventive care, and any AI-enabled solution must be designed to function across, or explicitly target, this uneven coverage landscape.

Figure 3. Status of state action on the Medicaid expansion decision, as of October 2026.(23)

Status of State Action on the Medicaid Expansion Decision

■ Adopted and implemented (41 states including DC) ■ Not adopted (10 states)



Note: * State has a trigger law that would end expansion coverage or require states to take steps to mitigate increases in state costs if federal funding for the expansion is reduced.

Source: KFF, Status of State Medicaid Expansion Decisions.

Community Health Centers & the Safety Net

Federally Qualified Health Centers (FQHCs) form the backbone of the U.S. primary care safety net. Nearly 1,400 health center organizations operate more than 16,000 service delivery sites nationwide, serving over 32 million patients in 2024 alone — the highest figure in the Health Center Program's sixty-year history.(14,15) FQHCs are required to serve all patients regardless of insurance status or ability to pay, and roughly nine in ten FQHC patients live below 200% of the federal poverty level.(16) Because FQHCs already serve as the point of first contact for many uninsured, low-income, and rural patients, they are a natural — though not exclusive — implementation partner for AI-enabled access solutions, and any

proposal should consider how it would integrate with, rather than duplicate, this existing safety net infrastructure.

Successful implementation may require collaboration among health care providers, community health organizations, public health agencies, and technology partners. Teams should identify potential implementation partners and explain how their proposed solution would integrate into existing health care infrastructure and workflows.

Workforce Shortages

The primary care workforce shortage compounds every other access problem described in this case. HRSA projects a shortage of over 70,000 full-time-equivalent primary care physicians nationally within the next decade, with the gap concentrated in rural and non-metro areas.(2) Nurse practitioners, physician assistants, and community health workers are increasingly relied upon to fill this gap, and AI tools that reduce administrative burden, automate documentation, or extend the effective reach of a smaller clinical workforce are among the most promising near-term applications for underserved settings.(2)

The Burden of Chronic Disease in Underserved America

Chronic disease is not a niche concern in the United States — it is the default health experience of most adults. Three in four American adults now live with at least one chronic condition, and more than half live with two or more; among adults 65 and older, that figure exceeds nine in ten.(18) The CDC estimates that chronic diseases such as heart disease, cancer, and diabetes drive the majority of the nation's \$5.3 trillion in annual health spending and remain the leading causes of death and disability.(18,19)

These conditions do not fall evenly across the population. Uninsured and underinsured Americans are significantly less likely to receive routine screenings for diabetes, hypertension, and cancer, meaning conditions are often diagnosed later and at a higher cost — both financial and clinical — than they would be with consistent preventive care. Rural patients face the added burden of distance: even a diagnosed condition can go unmanaged when the nearest endocrinologist, cardiologist, or diagnostic imaging center is over an hour away. Chronic conditions such as diabetes and hypertension are also among the conditions most amenable to remote monitoring and AI-assisted management, making them a natural focus area for many teams, though your proposal is not limited to these conditions and may target any chronic or preventable illness relevant to your chosen population.

Artificial Intelligence in Medicine

Current Landscape & FDA Regulation

AI-enabled medical devices have moved from a novelty to a mainstream feature of American health care in a remarkably short period. The FDA's public database of authorized AI- and machine-learning-enabled medical devices has grown from under a thousand devices in mid-2024 to well over 1,400 by the end of 2025, with roughly 300 new devices cleared in 2025 alone.⁽³⁾ The overwhelming majority of these tools are cleared through the FDA's 510(k) pathway, which relies on demonstrating substantial equivalence to a previously cleared predicate device, and radiology remains the dominant specialty, accounting for the large majority of all AI/ML clearances.⁽³⁾ As of early 2026, no FDA-authorized device relies on generative AI or large language models — nearly all cleared tools use narrower, predictive machine-learning models.

Despite this growth, transparency has not kept pace with volume. Recent analysis of 2024 device clearances found that fewer than a third of authorized devices publicly reported both sensitivity and specificity, and only about one in six disclosed the demographic makeup of the populations used to validate the device. This gap matters directly for your proposal: a device that performs well on average but was never validated on the population you intend to serve may not perform as claimed once deployed.

Applications for Access & Prevention

Several categories of AI application are especially relevant to expanding primary and preventive care access, and your team is encouraged to consider one or a combination of these, or other approaches not listed here:

- **AI-assisted diagnostic imaging and point-of-care screening** — for example, computer-vision tools that allow a community health worker or primary care provider without specialist training to screen for diabetic retinopathy, skin cancer, or cardiac abnormalities during a routine visit
- **Remote patient monitoring and predictive alerts** — wearable or home-based sensors paired with AI models that flag early signs of decompensation in chronic conditions such as heart failure, hypertension, or diabetes before they require an emergency room visit
- **AI-assisted triage and scheduling** — chat- or phone-based tools that help patients determine the urgency of a symptom and route them to the appropriate level of care, particularly useful where 911 or emergency department overuse strains rural systems
- **Administrative-burden reduction** — ambient documentation and clinical-note automation that free up limited clinician time for direct patient care, particularly valuable in short-staffed rural and safety-net clinics
- **Population health and outreach analytics** — models that mine claims, EHR, or public health data to identify patients overdue for a preventive screening, vaccination, or chronic disease follow-up, and to prioritize outreach with limited care-coordination staff

While complementary technologies such as telehealth platforms, mobile applications, and remote monitoring devices may support proposed solutions, artificial intelligence must serve a meaningful and

clearly defined role. Teams should explain how AI contributes to their solution, why it is appropriate for the identified problem, and how it improves upon existing approaches.

Barriers, Risks, and Ethical Considerations

Algorithmic Bias

AI systems trained on historically biased data can reproduce, and sometimes amplify, existing health disparities. The most widely cited example is a 2019 study that found a commercial care-management algorithm used across the U.S. health system systematically assigned lower risk scores to Black patients than to white patients with comparable levels of illness, because the model used prior health care spending as a proxy for medical need — a proxy that reflected years of unequal access to care rather than true clinical risk. When researchers corrected for this bias, the share of Black patients flagged for extra care support rose sharply.(9)

A second widely documented example involves the pulse oximeter, a device present in nearly every American exam room and hospital bed. Multiple studies have found that pulse oximeters overestimate blood oxygen saturation in patients with darker skin tones, causing dangerously low oxygen levels to be missed more often in Black and other non-white patients than in white patients.(4,10) Because pulse oximetry readings feed directly into many hospital early-warning systems and AI-based deterioration algorithms, a bias at the level of the physical sensor can propagate into every downstream tool that relies on it.(4) Any AI-enabled device your team proposes should be evaluated for this kind of upstream bias, and your proposal should describe concrete steps — such as diverse training and validation data, subgroup performance reporting, and ongoing post-deployment auditing — to identify and mitigate it.

Clinical Safety & Human Oversight

While AI can improve efficiency and expand access to care, its use in clinical settings introduces risks such as inaccurate predictions, missed diagnoses, and inappropriate recommendations. AI-enabled solutions should incorporate appropriate human oversight, clear escalation procedures, and safeguards to ensure patient safety. Teams should consider how clinical decisions will be reviewed, how errors will be addressed, and how responsibility will be maintained when AI is integrated into care delivery.

The Digital Divide

AI-enabled and telehealth solutions are only as useful as the infrastructure and digital literacy that support them. Roughly one-third of rural American households report meaningful internet insecurity, and the FCC estimates that millions of Americans still lack access to high-speed broadband, with rural communities disproportionately affected.(11) Even where broadband exists, research shows that rural counties use telehealth at lower rates than urban counties with comparable connectivity, suggesting that infrastructure alone does not close the gap — device access, digital literacy, trust, and cultural preference for in-person care all play a role, particularly among older adults and patients with chronic conditions.(12,13) Proposals that rely heavily on smartphone apps, video visits, or home broadband should explicitly address how they will reach patients who lack reliable connectivity or digital comfort, potentially including low-bandwidth designs, community access points, or non-digital fallback options.

Regulatory & Privacy Considerations

Any AI-enabled medical device or software intended to diagnose, treat, or monitor a medical condition is likely to fall under FDA oversight, primarily through the 510(k), De Novo, or Premarket Approval (PMA) pathways.⁽¹⁷⁾ Devices that continue to learn or update after deployment may also require a Predetermined Change Control Plan (PCCP), a newer FDA mechanism intended to allow adaptive AI models to evolve without requiring a new submission for every update, provided the scope of change is pre-specified and monitored.^(3,17) Proposals should also account for patient privacy requirements under the Health Insurance Portability and Accountability Act (HIPAA), informed consent for AI-assisted decision-making, and state-level telehealth licensure rules, which can restrict a provider's ability to treat patients across state lines. Teams are not expected to have formal regulatory expertise, but should demonstrate awareness of the pathway their solution would need to follow and a realistic accounting of the time and cost that pathway would add to their five-year timeline.

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