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A Clinical Lifeline

How Evidence-Based Infusion Care Models Close Gaps in Rural and Underserved Communities

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This white paper examines the evidence base for effective rural infusion care delivery and describes an operational model aligned with that evidence. It is intended for payers, policymakers, and health system leaders engaged in rural healthcare access and reimbursement.

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Executive Summary

Rural America faces a healthcare crisis. Ninety-two percent of rural counties are designated Primary Care Health Professional Shortage Areas, and rural communities have fewer than one-quarter the specialists available in urban centers.[1,2] Since 2010, more than 150 rural hospitals have closed, eroding the infrastructure that once anchored rural healthcare.[3] Within this fragile landscape, patients with chronic and complex conditions (heart failure, infections requiring IV antibiotics, autoimmune disorders, chemotherapy regimens) increasingly lack accessible venues for essential infusion therapy. As a result, rural patients default to costly emergency departments and inpatient hospitalizations for care that could be safely and effectively delivered in their communities.

The evidence, however, is clear: locally integrated care teams with continuity of provider relationships, nurse-led case management, and community pharmacy engagement produce measurably better outcomes for rural patients. These models reduce preventable hospitalizations, improve medication adherence, and lower overall healthcare costs. Yet rural infusion care remains underfunded and under deployed, a gap that perpetuates both clinical and economic harm.

This white paper examines the evidence base for effective rural healthcare delivery and describes how Access Infusion Care has constructed an operational model aligned with that evidence. Rather than importing external providers or relying on episodic encounters, Access embeds locally accountable clinical teams, nurses and pharmacists as co-equal pillars, within the communities they serve. The resulting model positions infusion centers as clinical anchors in rural health ecosystems, delivering continuity, case management, and medication stewardship while reducing reliance on costlier settings of care.

The paper's purpose is to inform payers, policymakers, and health system leaders about evidence-based approaches to rural infusion care and to make the case that reimbursement, policy, and investment mechanisms must evolve to support and scale these models.

The Rural Healthcare Crisis

Rural America faces convergent health and healthcare crises. The provider shortage is acute and well-documented. Ninety-two percent of rural counties are designated as Primary Care Health Professional Shortage Areas by the Health Resources and Services Administration.[1] The specialist gap is even more severe: rural communities average 30 specialists per 100,000

population, compared to 260 or more per 100,000 in urban areas.[2] This disparity reflects both the geographic distribution of medical professionals and decades of policy decisions that have concentrated investment in urban academic centers.

The physical infrastructure of rural healthcare has simultaneously eroded. Since 2010, more than 150 rural hospitals have closed.[3] These closures eliminate inpatient beds, emergency departments, laboratory services, and the clinical anchor points that coordinate care within their regions. For patients with complex conditions requiring infusion therapy (intravenous immunoglobulin, antibiotics, chemotherapy, biologic agents), the loss of local hospital infusion services forces either travel to distant urban centers or delayed and fragmented care.

Rural populations face a higher burden of chronic disease. Rural adults experience elevated rates of obesity, substance use disorder, diabetes, cardiovascular disease, and chronic obstructive pulmonary disease compared to their urban counterparts.[4] These conditions drive repeated healthcare encounters and medication regimens that demand adherence, monitoring, and clinical oversight. Yet the provider and infrastructure scarcity means that rural patients often lack consistent access to the ambulatory care they need to manage these conditions, increasing the likelihood of acute deterioration and emergency utilization.

Life expectancy trends underscore the human toll. Rural life expectancy has declined over the past decade, reversing gains made in prior decades.[5] This reversal reflects the combined impact of substance use disorders, suicide, and limited access to preventive and chronic disease management services.

Geographic distance creates a compounding barrier. A 2024 scoping review confirms that distance to healthcare influences access across nearly all conditions and settings, with significant distance decay occurring at as little as 16 kilometers (approximately 10 miles).[9] A rural health market and outcomes analysis conducted in partnership with the University of Michigan Ross School of Business found that patients living 20 or more miles from care are 7.38 times more likely to be nonadherent with treatment regimens; those 11–20 miles away are 4.64 times more likely to be nonadherent.[8] Sixty-seven percent of rural patients cite transportation as a reason for missed appointments.[8] For infusion therapy, which typically requires 2–4 hour appointments every 1–4 weeks, distance creates a substantial barrier to adherence and engagement.

Rural emergency department utilization data starkly illustrate the gap. Johnston and colleagues analyzed national data on preventable acute care use among an annual average of 241.3 million U.S. adults from 2008 to 2017. Rural residents had 45 percent higher rates of preventable ED visits than urban residents in 2008 (3,003 vs. 2,070 per 100,000), and 44 percent higher rates in 2017 (3,911 vs. 2,708 per 100,000). Rural residents also had 26 percent

higher rates of preventable hospitalizations. Critically, while preventable hospitalization rates declined in both rural and urban areas over the decade, preventable ED visit rates increased in both settings, with the rural–urban disparity persisting throughout the study period. The conditions driving the largest rural–urban differences in preventable acute care were precisely those managed through infusion therapy: congestive heart failure, bacterial pneumonia, urinary tract infection, and diabetes complications.[28] Separately, Greenwood-Ericksen and Kocher analyzed National Hospital Ambulatory Medical Care Survey data from 2005 to 2016 and found that rural ED visit rates increased by more than 50 percent, from 36.5 to 64.5 per 100 persons, far outpacing urban ED visit rates, which increased from 40.2 to 42.8 per 100 persons over the same period.[29] Together, these findings confirm that rural Americans are not merely using emergency departments at modestly higher rates than their urban counterparts; they are relying on emergency settings for preventable acute care at dramatically higher and growing rates, reflecting the absence of adequate ambulatory care infrastructure in their communities.

Within this context of provider shortage, infrastructure loss, chronic disease burden, and geographic barriers, outpatient infusion therapy represents a critical gap. Infusion encounters are often among the most consistent clinical touchpoints for rural patients with chronic and complex conditions. Yet where infusion services exist in rural areas, they are often sporadic, staffed by rotating contract nurses, insufficiently integrated with community pharmacy, and clinically disconnected from the patient's broader care team. This fragmentation undermines the continuity, consistency, and coordinated oversight that evidence shows rural patients need.

The Cost of Inaction: Avoidable Hospitalizations and Non-Adherence

Avoidable hospitalizations impose enormous costs on the healthcare system. Ambulatory Care Sensitive Conditions (ACSCs) are conditions such as pneumonia, cellulitis, heart failure, urinary tract infection, and poorly controlled diabetes that, when managed effectively in outpatient settings, rarely require inpatient admission. Yet approximately one in every ten U.S. healthcare dollars spent on inpatient care goes to avoidable hospital stays, representing a massive opportunity for cost reduction through improved outpatient capacity.[10]

The cost gradient across settings of care is steep. An emergency department visit costs approximately twice as much as an office visit; an inpatient stay costs roughly five times as much as an ED visit and ten times as much as an outpatient visit. This cost differential is driven

partly by resource intensity, but substantially by facility fees. Hospital facility fees account for 81 to 93 percent of total hospital payments, meaning that the mere location of care delivery, rather than the clinical service itself, drives much of the cost.[11]

Michigan provides a representative case study of the avoidable hospitalization burden. In Michigan, there were 249,180 admissions for ambulatory care sensitive conditions, consuming 1.72 million inpatient days with an average length of stay of 6 days, at a total cost of $4.26 billion ($613 million in rural hospitals and $3.6 billion in urban settings).[8] Eighty-one percent of Michigan's ACSH volume involves conditions treatable with infusion therapy: cellulitis (83,000 admissions), congestive heart failure (122,000), pneumonia (159,000), diabetes and complications (135,000), and seizure/epilepsy (58,000).[8] These conditions are precisely those managed through outpatient infusion care.

The cost implications intensify for patients with chronic conditions requiring biologic infusion therapy. Biologics represent only 2 percent of U.S. prescriptions but account for 37 percent of net drug spending, and biologic products comprise approximately 79 percent of Medicare Part B drug expenditure.[30,31] The top three categories of specialty drug spending are inflammatory disorders, oncology, and multiple sclerosis, with Medicare Part B spending on intravenous immunoglobulin and rheumatoid arthritis treatments among the fastest-growing categories.[31,32] These are precisely the conditions managed in outpatient infusion centers: rheumatoid arthritis, Crohn's disease, ulcerative colitis, multiple sclerosis, chronic inflammatory demyelinating polyneuropathy, primary immunodeficiency, and lupus. For these patients, the per-patient drug costs alone often exceed $50,000 annually, meaning that a single patient's non-adherence or treatment failure carries outsized financial consequences for the healthcare system.

Yet rural patients with these conditions face severe and well-documented access barriers that compound those costs. A 2025 national survey found that rural patients with inflammatory bowel disease were significantly more likely to be receiving no therapy at all and significantly less likely to receive advanced biologic therapies compared to urban patients.[33] In rheumatology, rural populations experience delayed access to specialist care, decreased likelihood of receiving biologic therapies, and worse clinical outcomes.[34] For multiple sclerosis, a 2024 geospatial analysis found that 17,937 U.S. census tracts have no MS center within 60 miles, and rural MS patients report greater difficulty accessing both MS-related care and mental health services, more barriers related to distance and facilities, and higher levels of disability.[35,36] A systematic review of biologics access disparities across immunology identified rural residence as a contributing factor to inequitable treatment access across rheumatology, gastroenterology, and dermatology.[37] When these patients cannot access infusion therapy locally, the consequences are not merely inconvenient; they include disease progression that is

often irreversible, escalation to more intensive and costly interventions, and preventable disability.

The financial burden of medication non-adherence compounds the cost of hospitalizations. Non-adherence to medication regimens costs between $949 and $44,190 per individual per year, depending on the condition and the cost of the untaken medication.[8] Forty to fifty percent of patients fail to adhere adequately to prescribed medication regimens. Across the U.S. healthcare system, non-adherence drives approximately $100 billion in preventable medical costs annually. Patients with increasing medication non-adherence demonstrate a threefold increase in total healthcare costs, driven largely by preventable acute exacerbations and complications.[8]

Appointment no-show rates represent a parallel form of care fragmentation. No-show rates in healthcare range from 5.5 to 50 percent, with rural rates typically higher than urban rates. No-shows cost the healthcare system approximately $150 billion annually in wasted capacity and delayed care.[8] For infusion patients, who may occupy a chair for several hours, a no-show represents both lost clinical opportunity and underutilized capacity.

Yet non-adherence and poor outcomes are not inevitable. They are largely preventable with adequate outpatient infrastructure, continuity, and clinical engagement. The benefit-cost ratios for adherence intervention are robust. For adults under 65, adherence-promoting interventions yield a two-to-one benefit-cost ratio; for older adults with hypertension, the ratio reaches 13-to-one.[8] These returns demonstrate that investment in rural outpatient capacity is not merely a clinical imperative, but an economic one.

What the Evidence Says Works: The Case for Locally Integrated Care Teams

Over the past fifteen years, health services research has converged on three evidence-based pillars of effective rural primary and chronic disease management: continuity of care, nurse-led case management, and community pharmacy engagement. When integrated locally, with providers embedded in communities rather than rotated in or distant, these elements produce measurably superior outcomes. Understanding this evidence base is essential to evaluating any model of rural infusion care delivery.

Pillar One: Continuity of Care

The protective effects of continuity are well-established. Nyweide and colleagues analyzed Medicare claims for 3.27 million beneficiaries and found that a 0.1-point increase in a continuity of care score (a measure of whether patients see the same providers over time) was associated with approximately 2 percent lower rates of preventable hospitalization.[12] The conditions most prevented by continuity were those most common in infusion therapy: congestive heart failure (25 percent of prevented admissions), bacterial pneumonia (22.7 percent), urinary tract infection (14.9 percent), and chronic obstructive pulmonary disease (12.5 percent). This demonstrates that continuity does not merely improve satisfaction or minor outcomes; it directly prevents acute deteriorations that would otherwise require hospitalization.

Bentler and colleagues followed 1,219 Medicare beneficiaries over five years and found that patient-reported continuity of care was associated with reduced emergency department utilization, reduced preventable hospitalization, and improved survival.[13] The magnitude of effect was substantial: patients reporting the highest continuity experienced up to 10 percent lower emergency department utilization and up to 20 percent lower utilization for usual provider continuity compared to those with the lowest continuity. Importantly, this study measured continuity as perceived by patients (the sense of seeing the same provider, of that provider knowing their medical history, of care being coordinated), suggesting that continuity's benefits operate partly through mechanisms of trust, disclosure, and engagement.

A comprehensive 2024 systematic review by Saultz and colleagues analyzed mortality outcomes across 22 high-quality studies of continuity of care. Eighteen of the 22 studies (81.8 percent) reported statistically significant reductions in mortality with increased continuity.[14] The consistency of this finding across diverse populations, conditions, and healthcare settings speaks to continuity as a fundamental pathway to safety and outcomes.

For infusion patients specifically, continuity translates to earlier detection of deterioration. A nurse who infuses the same patient multiple times per month develops knowledge of that patient's baseline, recognizes subtle changes in mental status, volume status, or ability to care for their central line, and can flag concerns for clinical follow-up before they escalate. This relationship-based vigilance is difficult to replicate in systems with high provider turnover or contract staffing.

Pillar Two: Nurse-Led Case Management

Nurse case managers in chronic disease settings deliver measurable improvements in adherence and clinical outcomes. Ishani and colleagues conducted a randomized controlled trial of 556 patients with diabetes, comparing usual care to usual care plus a nurse case manager. Patients randomized to nurse case management were nearly twice as likely to

achieve all cardiovascular prevention targets: 22 percent in the intervention arm versus 10 percent in usual care, a relative risk of 2.2.[15] This demonstrates that nurse case management, by intensifying engagement and coordinating multiple elements of care, can shift the distribution of outcomes substantially.

For heart failure specifically, a 2021 meta-analysis of 25 randomized controlled trials involving 8,422 patients found that nurse-led transitional care reduced all-cause readmission by 9 percent (relative risk 0.91) and heart failure-specific readmission by 29 percent (relative risk 0.71).[16] While these studies focused on post-hospitalization transitions, the underlying mechanism (nurse-led assessment, education, medication review, and symptom monitoring) is precisely what infusion-based case management can provide in outpatient settings.

A 2025 systematic review by Ruksakulpiwat and colleagues examined nurse-led interventions across multiple chronic conditions and found consistent benefits. Nurse-led interventions significantly enhanced medication adherence, reduced hospitalizations by 2–8.9 percent across conditions, and reduced readmissions by 14.8–51 percent.[17] The breadth of these benefits, spanning adherence, hospitalization, and readmission, suggests that nurse case management addresses multiple pathways to poor outcomes simultaneously.

The mechanism underlying these benefits operates at the level of human relationship and clinical engagement. Nurses who conduct longitudinal assessments of patients develop nuanced understanding of adherence barriers, social determinants, side effects, and preferences. This knowledge enables targeted intervention, from connecting patients to transportation resources to simplifying regimens, addressing side effects, and coordinating with prescribing providers, that generic outpatient encounters often miss. Embedded case managers in primary care have been shown to reduce per-member costs, decrease hospital admissions, and reduce variation in utilization.[18] The staffing model matters here: when nurses are W-2 employees rather than contractors, and when they carry consistent panels of patients, the conditions for continuity documented by Nyweide, Bentler, and Saultz are structurally enabled rather than left to chance. Contract and agency staffing models, by design, rotate providers across sites and patients, making the sustained relationships that drive continuity's documented benefits difficult to achieve.

Pillar Three: Community Pharmacy Engagement

Community pharmacists represent an underutilized but evidence-supported resource for improving medication adherence and outcomes in rural settings. Milosavljevic and colleagues conducted a systematic review of 22 studies and found that community pharmacist interventions, including medication counseling, adherence support, and clinical monitoring, improved medication adherence and clinical outcomes across diverse conditions.[19]

Daly and colleagues studied 1,263 Medicare Advantage patients across 25 independent community pharmacies. Patients who were nonadherent at baseline and received targeted pharmacist interventions increased their proportion of days covered (a standard adherence metric) by 14 percentage points, from 74 percent to 88 percent.[20] This 14-point increase represents the difference between patterns of adherence that produce clinical benefit and patterns that do not.

A 2023 meta-analysis of 18 studies examining pharmacist-led interventions on medication adherence found that patients receiving pharmacist counseling had 4.41 times the odds of achieving adequate adherence compared to controls.[21] This effect size is comparable to many pharmaceutical interventions, suggesting that pharmacist engagement is a high-value clinical lever.

Rural Americans have particular reason to rely on pharmacists for medication guidance and management. Ninety percent of Americans live within 5 miles of a pharmacy, and this geographic accessibility remains true in many rural areas.[22] Pharmacists are available without appointment, understand medication safety, and, when engaged as clinical partners rather than back-end support, can detect drug interactions, identify adherence barriers, and educate patients on the use and side effects of complex regimens.

Synthesis: The Integrated Local Care Model

The evidence converges on a model in which continuity, nurse case management, and community pharmacist engagement, delivered locally by providers embedded in the communities they serve, produce superior outcomes for rural patients with chronic disease. These three elements are not independent; they reinforce one another. Continuity allows nurses to build relationships that enable disclosure of adherence barriers and side effects; pharmacists embedded in the community can coordinate with local nurses and providers; nurses can identify medication-related problems and facilitate pharmacist consultation. When all three elements are present, and when providers are local and accountable, the result is a system optimized for rural patient engagement and outcomes.

The Integrated Local Care Model in Practice: Access Infusion Care

Access Infusion Care has constructed its operational model explicitly around the evidence base described above. The company operates infusion centers in rural and underserved markets, with current locations in Michigan, Mississippi, and Montana and expansion plans

underway. The model departs from conventional infusion center operations in several critical ways.

First, Access's clinical teams are locally embedded. Nurses and pharmacists are W-2 employees, not contract staff, and they live and work in the communities they serve. This staffing model is not incidental; it is the structural foundation for the continuity of care that evidence shows reduces preventable hospitalizations and mortality. W-2 employment with consistent patient panels creates the conditions under which nurses develop deep knowledge of individual patients, recognize early signs of deterioration, and build the trust that promotes disclosure and adherence. Contract and rotating staffing models, however efficient for short-term coverage, do not produce these relationships. Access's local presence also creates accountability, visibility, and the opportunity to build relationships with referring providers and community partners.

Second, Access positions nurses and pharmacists as co-equal clinical pillars. Rather than a model in which a nurse administers infusions under the remote oversight of a physician and a pharmacist in a back-office function, Access embeds pharmacists in patient care as patient-facing clinicians. Pharmacists conduct medication reviews, educate patients on their infusions and complementary medications, identify adherence risks, and communicate with prescribing providers about concerns. This patient-facing role is not ancillary; it is central to the model's effectiveness.

Third, Access's nurses provide case management continuity. Each patient is assigned to a consistent nurse whenever possible. This nurse administers the infusion, monitors vital signs and clinical status, assesses for complications or new symptoms, educates the patient on self-care and medication adherence, and communicates with the patient's primary care provider and other members of the care team. The nurse spends multiple hours with the patient across infusion encounters, time that creates opportunity for relationship building, symptom exploration, and early detection of deterioration.

Fourth, the model emphasizes whole-patient monitoring. Access clinicians assess not only the infusion-related clinical domain, but also medication adherence, mental health, social determinants, barriers to care, and engagement with primary care. For a rural patient with limited other touchpoints in the healthcare system, the infusion center becomes a consistent venue for comprehensive assessment and care coordination.

Fifth, Access actively coordinates with referring providers. Regular communication about patient status, adherence, emerging concerns, and clinical plans ensures that the infusion center functions as part of the patient's care team rather than as an isolated encounter. In rural areas where primary care capacity is limited and where patients may see specialists

infrequently, this coordination can be the difference between early intervention and preventable deterioration.

The trust dimension warrants emphasis. In rural communities, healthcare trust is built through familiarity and local accountability. Patients are more likely to disclose symptoms, side effects, adherence challenges, and social barriers to clinicians they see consistently and who understand the economic and social realities of their community. This disclosure enables earlier identification of problems and more targeted intervention. Conversely, episodic encounters with rotating providers, or with providers who lack community context, typically yield less disclosure and more guarded communication. Access's emphasis on local, continuous provider relationships is not merely a preference; it is a pathway to clinically superior engagement and outcomes.

The University of Michigan analysis documented that only 26.7 percent of patients maintained infusion drips properly before receiving structured education, compared to 80 percent after education.[8] This finding underscores the critical importance of patient-facing clinical engagement, both nursing and pharmacy, in ensuring that infusion therapy is delivered safely and effectively.

The Patient Experience: What Rural Infusion Access Means in Practice

Behind the clinical evidence and economic data are patients whose daily lives are shaped by whether infusion care is available in their communities. For a rural patient prescribed intravenous immunoglobulin for an autoimmune disorder, or IV antibiotics for a serious infection, or a biologic agent for rheumatoid arthritis, the absence of local infusion services means a recurring burden that compounds with every treatment cycle. A systematic review and qualitative meta-synthesis of rural patients' experiences accessing chronic disease care found that geographic distance creates cascading barriers: the financial cost of travel, lost wages from time away from work, physical exhaustion from traveling while ill, reliance on family members or neighbors for transportation, and the emotional toll of isolation from local support systems.[25] For infusion patients specifically, these burdens are amplified by the frequency and duration of treatment: appointments lasting two to four hours, repeated every one to four weeks, often requiring a caregiver to accompany the patient.

Rural patients consistently report that continuity of relationship with a known clinician is among the most valued aspects of their care experience.[25] When care is available locally and delivered by familiar providers, patients describe feeling safer, more willing to disclose concerns, and more confident in their care plans. Conversely, rotating through unfamiliar clinicians in distant facilities erodes trust and engagement. As one patient in a qualitative study described, being seen by a different provider at every visit forces the patient to re-

explain their history each time, creating frustration and disengagement that undermines adherence.[26]

Access's model directly addresses these experiential barriers. When a patient can receive infusion therapy within their own community, administered by a nurse they know and trust, with a pharmacist available to answer medication questions, the treatment experience shifts fundamentally. The infusion appointment becomes a consistent, manageable part of the patient's life rather than a disruptive ordeal. Caregivers are relieved of the burden of long-distance transportation. Patients are more likely to keep appointments, to arrive prepared, and to engage openly with their clinical team. These experiential improvements are not separate from clinical outcomes; they are the mechanism through which clinical outcomes improve. A patient who feels known, supported, and cared for in a familiar setting is a patient who adheres to therapy, reports symptoms early, and avoids the preventable deterioration that drives emergency utilization and hospitalization.

Community Anchor: Investing Beyond the Infusion Chair

Access's local presence extends beyond clinical encounters. In rural communities where healthcare infrastructure has eroded, infusion centers that invest in their community's function as anchor institutions, organizations that are rooted in place and whose sustained presence generates economic and social value beyond their primary mission. Research on anchor institutions in healthcare demonstrates that locally rooted health organizations generate employment, build trust, and strengthen the social fabric that supports health outcomes.[23]

Access incentivizes its local teams to actively engage in their communities through activities such as blood pressure screenings, vaccine clinics, and health education events. Access is formalizing tracking and reporting of these community engagement activities to document their reach and impact on referral patterns and patient acquisition. These engagements serve multiple functions. They create touchpoints with community members who may benefit from infusion services but are unaware of local options. They build the trust and familiarity that evidence shows improves patient willingness to disclose symptoms and adhere to care plans. And they position Access's clinicians as recognized members of the community's health ecosystem, strengthening referral relationships with local primary care providers.

Community health worker and community-based outreach programs have demonstrated measurable benefits in underserved populations. Kangovi and colleagues, in a randomized controlled trial published in JAMA Internal Medicine, found that community-based interventions addressing social determinants of health improved chronic disease outcomes and reduced hospitalizations among high-risk patients.[24] While Access's community

engagement model differs from formal community health worker programs, the underlying mechanism is similar: local presence, trust, and proactive outreach reduce barriers to care and improve engagement among populations that traditional healthcare delivery models often fail to reach.

Access is actively collecting data on outcomes within its patient population, including medication adherence, hospitalization rates, emergency department utilization, and patient satisfaction. These data, once analyzed and published, will provide empirical validation of the model's alignment with evidence-based principles and its impact on rural outcomes.

Solving the Prescriber's Problem: Value for Referring Physicians and Specialists

Specialists and primary care providers who prescribe infusion therapies for rural patients face a persistent operational challenge: they can write the prescription, but they often lack confidence that the patient can access and adhere to the prescribed regimen. A rheumatologist prescribing a biologic infusion, a neurologist initiating immunoglobulin therapy, or an infectious disease specialist ordering a course of IV antibiotics must rely on downstream infrastructure to ensure the therapy is actually administered. When that infrastructure is absent or unreliable in rural markets, the prescriber faces a clinical dilemma. They may delay initiating therapy, substitute less effective oral alternatives, or proceed with a prescription knowing that adherence is uncertain.

Access's model addresses this gap directly. By providing a consistent, locally available infusion venue staffed by nurses and pharmacists who communicate regularly with prescribing providers, Access gives specialists and primary care physicians confidence that prescribed therapies will be initiated on schedule, administered safely, and monitored for adverse events and adherence. The regular clinical communication that Access maintains with referring providers, including updates on patient status, adherence, and emerging concerns, transforms the infusion center from an opaque downstream service into a visible, accountable extension of the prescriber's care team.

For primary care providers in rural settings, who often manage complex patients with limited specialist access, Access's pharmacist engagement provides an additional clinical resource. Pharmacists embedded in patient care can identify drug interactions, flag adherence concerns, and coordinate medication adjustments with prescribers, reducing the cognitive and administrative burden on rural primary care providers who are already stretched by panel sizes that exceed their urban counterparts. This collaborative dynamic makes infusion referrals to Access operationally simple and clinically reliable for prescribers, which in turn supports appropriate therapy initiation and sustains the prescriber-patient relationship.

The Economic Case for Payers

For payers, the economic case for rural infusion care models rests on three pillars: reduced reliance on costly inpatient and emergency settings, improved medication adherence with demonstrable cost offsets, and improved patient experience with positive impacts on retention.

Although patients requiring infusion therapy represent a small proportion of the broader rural population, they account for a disproportionate share of healthcare utilization and cost. These are patients with complex, chronic conditions whose treatment failures result in emergency department visits, hospitalizations, and readmissions. The cost avoidance and quality impact generated by keeping these patients adherent and clinically stable justifies focused investment in the infrastructure that serves them.

Rural infusion centers reduce costly settings of care. As discussed, the cost of care varies dramatically by setting: emergency department visits cost roughly twice as much as office visits; hospital admissions cost five to ten times as much as outpatient care, with facility fees driving much of this difference. Conditions treated in rural infusion centers (cellulitis, congestive heart failure, pneumonia, diabetic complications, seizure disorders) represent the largest categories of avoidable hospital admissions. In Michigan alone, 81 percent of ambulatory care sensitive condition hospitalizations involve conditions treatable with infusion therapy.[8] If even a modest proportion of these admissions could be prevented through adequate rural infusion capacity and improved outpatient management, the cost savings would be substantial.

Improved medication adherence produces quantifiable benefit-cost ratios. Adherence-promoting interventions in chronic disease populations yield benefit-cost ratios of 2:1 for adults under 65 and 13:1 for older adults with hypertension.[8] For payers, even modest improvements in adherence, achieved through nurse case management and pharmacist engagement, produce rapid return on investment. Patients with increasing non-adherence demonstrate a threefold increase in total healthcare costs.[8] A rural infusion center that improves adherence in a population of several hundred patients can prevent dozens of hospitalizations annually, with cost savings exceeding the operating investment.

Patient experience and retention also carry financial implications. Negative word-of-mouth from dissatisfied patients can cost providers up to $400,000 over the lifetime of a patient's healthcare engagement, and new patient acquisition costs six to seven times as much as retention.[8] Rural patients who experience consistent, high-quality care at local infusion centers

are more likely to remain engaged, to adhere to prescribed regimens, and to recommend services to others.

For Medicare Advantage payers specifically, the financial stakes of quality performance make rural infusion care models directly relevant to plan economics. CMS Medicare Advantage STAR ratings, which determine bonus payments and enrollment competitiveness, weight medication adherence measures at triple value and patient experience measures (CAHPS) at quadruple value. HEDIS measures that track medication adherence for chronic conditions, plan all-cause readmissions, and care coordination are central to STAR rating calculations. The care model described in this paper, with its emphasis on nurse-led case management, pharmacist engagement, and continuity of provider relationships, directly influences performance on these high-weighted measures. A rural infusion center that improves medication adherence, reduces preventable readmissions, and produces higher patient satisfaction scores generates measurable STAR rating improvement for the Medicare Advantage plans that cover its patients. In an environment where a single star can represent millions of dollars in bonus payments, the alignment between integrated rural infusion care and STAR-relevant quality measures creates a direct financial incentive for payers to support these models. The Michigan case study illustrates scale: the $4.26 billion in total ACSH costs annually, with 81 percent involving infusion-treatable conditions, represents roughly $3.45 billion in potentially addressable costs.[8] Even modest reductions in avoidable hospitalization rates through expanded rural infusion capacity would produce significant savings at scale.

Expanding Access for Pharmaceutical Manufacturers

Drug manufacturers face a parallel challenge in rural markets. Patients who are prescribed specialty and infusion-administered medications (biologics, immunoglobulins, chemotherapy agents, and enzyme replacement therapies) often struggle to access infusion services within a reasonable distance. When patients cannot access infusion care locally, prescriptions go unfilled, therapy initiation is delayed, and adherence deteriorates. Manufacturers invest heavily in patient access programs and hub services, yet these programs are often designed around urban infrastructure and fail to solve the geographic access problem in rural communities.

Rural infusion centers with locally embedded clinical teams address this gap directly. By providing a consistent, accessible venue for infusion therapy, they improve the likelihood that prescribed medications are actually initiated, administered on schedule, and continued over time. Improved adherence benefits manufacturers through sustained prescription volume, but the benefit is ultimately clinical: patients receive the therapies their conditions require, in settings that provide the monitoring and support needed for safe and effective treatment. For

manufacturers evaluating where to invest patient access resources, rural infusion infrastructure represents an underserved channel with significant potential to improve real-world treatment outcomes.

Strengthening Rural Hospitals: Infusion Care as a Discharge and Readmission Reduction Partner

Rural hospitals face compounding financial and operational pressures that make local infusion partnerships strategically valuable. Medicare's Hospital Readmissions Reduction Program (HRRP), established under the Affordable Care Act, penalizes hospitals with excess 30-day readmissions for targeted conditions including heart failure, pneumonia, and chronic obstructive pulmonary disease. Penalties can reduce a hospital's entire Medicare inpatient reimbursement by up to 3 percent, and rural hospitals have experienced higher rates of penalty and higher average penalties than their urban counterparts.[27] For hospitals already operating on thin margins, these penalties represent a material financial threat.

The conditions targeted by the HRRP overlap substantially with those managed through infusion therapy. Heart failure, pneumonia, and COPD exacerbations often require IV antibiotics, diuretics, or other infusion-administered treatments following hospital discharge. When patients lack access to reliable outpatient infusion services after discharge, the risk of deterioration and readmission increases. Rural infusion centers positioned as structured discharge partners can receive patients directly from hospital discharge, continue IV therapy regimens in an outpatient setting, provide the nurse-led monitoring and case management that evidence shows prevents readmission, and communicate patient status back to the discharging hospital and primary care team.

Beyond readmission reduction, many rural hospitals struggle to sustain their own infusion service lines. Low patient volumes, staffing challenges, and the overhead of maintaining infusion chairs within a hospital setting can make hospital-based infusion services financially unsustainable. Partnering with a dedicated outpatient infusion provider allows rural hospitals to transition infusion services to a more efficient community-based setting while maintaining clinical continuity for their patients. This partnership model preserves the hospital's role in the care continuum without requiring it to sustain a service line that may not be economically viable within its four walls. For rural health systems evaluating how to allocate limited resources, a community infusion partner offers a pathway to better outcomes, reduced readmission penalties, and more efficient use of hospital capacity.

Policy Imperatives: What Needs to Change

While evidence clearly supports rural infusion care models, current policy and reimbursement mechanisms create barriers to their expansion and sustainability. Several policy changes would improve alignment between evidence and practice.

Rural infusion reimbursement must adequately fund all three core components of infusion care delivery. Commercial and Medicare Advantage infusion reimbursement comprises three distinct payment components: drug reimbursement, therapy per diems, and infusion nursing services. Therapy per diem definitions already encompass the patient-care activities central to integrated rural infusion models, including nurse case management, pharmacist engagement, care coordination, and whole-patient monitoring. The issue is not that these services lack a reimbursement category; it is that therapy per diems and infusion nursing reimbursement are frequently set below the actual cost of delivering these services. Historically, drug reimbursement margins have cross-subsidized these deficits, allowing infusion providers to absorb below-cost service and per diem rates. However, as drug margins compress under formulary management, biosimilar competition, and payer contracting pressure, this cross-subsidy is eroding. The result is a reimbursement structure that is increasingly unsustainable for infusion providers, and acutely so in rural markets, where lower patient volumes, greater staff travel distances, and the need to maintain care capability across sparse populations amplify per-patient operating costs. Payers must recognize and adequately reimburse all three components of the infusion payment model if rural infusion infrastructure is to remain viable.

A rural infusion modifier offers a practical, implementable mechanism to ensure sustainable rural access. Rather than creating new billing categories or restructuring existing code sets, payers can leverage established claims modifiers, such as the AQ modifier (services furnished by a provider in a Health Professional Shortage Area) or AR modifier (services furnished by a provider in a physician scarcity area), to apply enhanced reimbursement to infusion nursing services and therapy per diems when care is delivered in designated rural or underserved areas. This approach is administratively straightforward: it requires no new infrastructure on the payer side, integrates with existing claims adjudication systems, and creates a transparent, auditable mechanism for directing incremental reimbursement to the providers who are delivering care in the markets that need it most. Critically, the rural infusion modifier is additive to the broader imperative of fair base reimbursement for therapy per diems and infusion nursing services. The modifier addresses the incremental cost burden of rural operations; it does not substitute for adequate base rates. When infusion services and per diems are reimbursed at sustainable levels and rural modifiers offset the structural cost premium of rural delivery, the economic model for rural infusion care becomes viable, and the downstream cost avoidance from improved adherence, reduced emergency department

utilization, and prevented hospitalizations generates net savings for payers that exceed the incremental reimbursement investment.

Payers should pilot outcome-based payment models tied to rural infusion modifiers. The rural infusion modifier framework creates a natural foundation for outcome-based partnerships. Payers implementing enhanced reimbursement through rural modifiers can tie that incremental investment to measurable outcomes: medication adherence improvement, hospitalization reduction, emergency department utilization reduction, patient satisfaction, and quality of life. These arrangements align payer and provider incentives; providers receive sustainable reimbursement for delivering integrated care in underserved markets, and payers receive verifiable evidence of cost avoidance and clinical improvement. Rather than relying on external literature alone, direct outcome-based pilots generate local data that can validate the return on investment and inform reimbursement policy at regional and national scales.

Regulatory barriers to rural infusion expansion must be addressed. Scope of practice laws, licensing requirements, and regulations governing pharmacy practice vary by state and sometimes create barriers to the kind of integrated care that evidence supports. Regulatory agencies should work with rural healthcare stakeholders to ensure that scope of practice rules enable, rather than inhibit, integrated rural care delivery.

Reimbursement complexity must be recognized as a barrier to care access, not merely an administrative inconvenience. The process of obtaining coverage for infusion therapy is among the most administratively burdensome in healthcare. Prior authorization requirements, step therapy protocols, benefits verification, and appeals processes create layers of delay between a prescriber's clinical decision and the patient's receipt of treatment. For specialty and biologic medications, prior authorization alone can delay therapy initiation by days or weeks. These administrative barriers fall disproportionately on rural patients and smaller practices, which lack the dedicated staff and institutional resources that large health systems deploy to navigate payer requirements. Rural primary care providers managing complex patients with limited administrative support face a particular burden: the time and effort required to obtain authorization for infusion therapy competes directly with time available for patient care. When the reimbursement process is too complex or too slow, prescribers may delay initiating appropriate therapy, patients may abandon treatment before it begins, and the downstream clinical and economic consequences, including preventable hospitalizations, accrue to both patients and payers. Payers and policymakers should evaluate how prior authorization and coverage determination processes for infusion therapy can be streamlined, particularly in rural and underserved markets where administrative friction compounds geographic access barriers. Reducing reimbursement complexity is not merely an operational

improvement; it is a clinical access issue with direct implications for patient outcomes and healthcare costs.

Infrastructure incentives should explicitly include outpatient infusion. Federal grants, tax incentives, and HPSA-based programs often focus on hospital and primary care development while neglecting outpatient infusion as critical rural infrastructure. Policy should broaden these programs to include rural infusion centers as eligible recipients. This would lower the capital barriers to establishing infusion services in underserved markets.

Research investment is needed to close literature gaps. While evidence strongly supports nurse continuity, case management, and pharmacist engagement in primary care and specialty settings, relatively few studies have specifically examined these interventions in the infusion care setting. Research funding, from NIH, AHRQ, and foundations focused on rural health, should prioritize studies of nurse-led continuity in outpatient infusion settings, community pharmacy engagement in infusion care, and the impact of integrated infusion models on hospitalization reduction and cost. This research would provide rural-specific evidence and support scaling of proven models.

Conclusion

The evidence is unambiguous: rural patients benefit measurably from care delivered by locally accountable clinical teams that emphasize continuity, nurse-led case management, and community pharmacy engagement. These three elements, supported by robust evidence across multiple patient populations and conditions, directly prevent hospitalization, improve medication adherence, enhance outcomes, and reduce costs.

Access Infusion Care's operational model is constructed around these evidence-based pillars. By embedding locally accountable nurses and pharmacists in rural communities, by emphasizing continuity of provider relationships, by positioning pharmacists as patient-facing clinical partners, and by treating infusion encounters as venues for comprehensive care coordination, Access operationalizes what the evidence shows works. This approach transforms infusion centers from peripheral service providers into clinical anchors in fragile rural health ecosystems.

For payers, the economic case is strong. Rural infusion care reduces reliance on costlier emergency and inpatient settings, improves adherence with documented benefit-cost ratios, and enhances patient experience and retention. For prescribers and specialists, locally available infusion infrastructure provides confidence that prescribed therapies will be initiated,

administered safely, and monitored over time. For rural hospitals, community infusion partners offer a pathway to reduced readmission penalties and more efficient allocation of scarce resources. For policymakers, the strategic imperative is equally clear: rural healthcare infrastructure is eroding, and the conditions that require infusion therapy are increasing in prevalence and complexity. Enabling sustainable models of rural infusion care is essential to preventing the avoidable hospitalizations and mortality that current infrastructure gaps produce.

The question facing payers and policymakers is not whether rural infusion care works; the evidence demonstrates that it does. The question is how to enable its expansion. This requires reimbursement mechanisms that reflect integrated care value, payment models that account for rural operating realities, direct outcome-based partnerships between payers and providers, regulatory environments that enable integrated practice, infrastructure incentives that recognize outpatient infusion as essential, and research investment that deepens the rural-specific evidence base.

Rural Americans deserve healthcare systems that serve them effectively, not merely as geographic margins of urban-centered systems. Evidence-based rural infusion care models represent a pathway to that goal. The case for action is clinical, economic, and moral.

References

1. Health Resources and Services Administration (HRSA). Primary Care Health Professional Shortage Areas. 2023.

2. Association of American Medical Colleges (AAMC). Physician Supply and Demand: Projections 2021-2036. 2023.

3. Cecil G. Sheps Center for Health Services Research. Rural Hospital Closures. University of North Carolina; 2023.

4. Centers for Disease Control and Prevention (CDC). Health Disparities in Rural America. 2022.

5. Singh GK, Siahpush M. Widening Rural-Urban Disparities in Life Expectancy, U.S., 1969-2009. American Journal of Preventive Medicine. 2022;63(2): e33-e42.

6. National Rural Health Association (NRHA). Rural Health Disparities Policy Brief. 2021.

7. Centers for Disease Control and Prevention (CDC). Rural Health Disparities: Contemporary Solutions for Persistent Rural Public Health Challenges. Preventing Chronic Disease. 2025;22(250202).

8. Access Infusion Care Rural Health Market and Outcomes Analysis. Conducted in partnership with the University of Michigan Ross School of Business. 2025.

9. Impact of Distance and Travel Time on Healthcare Service Access in Rural and Remote Areas: A Scoping Review. Healthcare. 2024.

10. Agency for Healthcare Research and Quality (AHRQ). Preventing Avoidable Hospitalizations: AHRQ Quality Indicators. 2022.

11. Medicare Payment Advisory Commission (MedPAC). Report to the Congress: Medicare Payment Policy. 2023.

12. Nyweide DJ, et al. Continuity of Care and the Risk of Preventable Hospitalization in Older Adults. JAMA Internal Medicine. 2013;173(20):1879–1885.

13. Bentler SE, et al. The Association of Longitudinal and Interpersonal Continuity of Care with Emergency Department Use, Hospitalization, and Mortality Among Medicare Beneficiaries. PLOS ONE. 2014;9(12): e115088.

14. Saultz JW, et al. The Wall of Evidence for Continuity of Care: How Many More Bricks Do We Need? Annals of Family Medicine. 2024;22(3):190–198.

15. Ishani A, et al. Effect of Nurse Case Management Compared with Usual Care on Controlling Cardiovascular Risk Factors in Patients with Diabetes: A Randomized Controlled Trial. Diabetes Care. 2011;34(8):1689–1694.

16. Effects of Nurse-Led Transitional Care Interventions for Patients with Heart Failure on Healthcare Utilization: A Meta-Analysis of Randomized Controlled Trials. PLOS ONE. 2021.

17. Ruksakulpiwat S, et al. Nurse-Led Interventions to Improve Health, Adherence, and Functional Outcomes in Adults and Older Adults with Multimorbidity: A Systematic Review. Journal of Nursing Management. 2025.

18. Collaborating for Care: Initial Experience of Embedded Case Managers Across Five Medical Homes. 2013.

19. Milosavljevic A, et al. Community Pharmacist-Led Interventions and Their Impact on Patients' Medication Adherence and Other Health Outcomes: A Systematic Review. International Journal of Pharmacy Practice. 2018;26(5):387–397.

20. Daly CJ, Verrall K, Jacobs DM. Impact of Community Pharmacist Interventions with Managed Care to Improve Medication Adherence. Research in Social and Administrative Pharmacy. 2021;17(2):358-368.

21. Effectiveness of Pharmacist-Led Intervention on Medication Adherence in Chronic Diseases: A Systematic Review of Randomized Controlled Trials. 2023.

22. National Association of Chain Drug Stores (NACDS). Pharmacies: Improving Health, Reducing Costs. 2022.

23. Koh HK, et al. Anchor Institutions: Best Practices to Address Social Needs and Social Determinants of Health. American Journal of Public Health. 2020;110(3):309-316.

24. Kangovi S, et al. Effect of Community Health Worker Support on Clinical Outcomes of Low-Income Patients Across Primary Care Facilities: A Randomized Clinical Trial. JAMA Internal Medicine. 2018;178(12):1635-1643.

25. Chronic Disease Patients' Experiences with Accessing Health Care in Rural and Remote Areas: A Systematic Review and Qualitative Meta-Synthesis. Ontario Health Technology Assessment Series. 2013;13(15):1-33.

26. Wilkinson E, et al. Rural Patient Experiences of Accessing Care for Chronic Conditions: A Systematic Review and Thematic Synthesis of Qualitative Studies. Journal of General Internal Medicine. 2022;37(13):3250-3261.

27. Kaiser Family Foundation. Fewer Hospital U-turns: The Medicare Hospital Readmission Reduction Program. 2017.

28. Johnston KJ, Wen H, Kotwal A, Joynt Maddox KE. Comparing Preventable Acute Care Use of Rural Versus Urban Americans: An Observational Study of National Rates During 2008-2017. Journal of General Internal Medicine. 2021;36(12):3728-3736.

29. Greenwood-Ericksen MB, Kocher K. Trends in Emergency Department Use by Rural and Urban Populations in the United States. JAMA Network Open. 2019;2(4): e191919.

30. Tichy EM, et al. National Trends in Prescription Drug Expenditures and Projections for 2024. American Journal of Health-System Pharmacy. 2024;81(14): e349-e367.

31. Office of the Assistant Secretary for Planning and Evaluation (ASPE). Medicare Part B Drugs: Trends in Spending and Utilization, 2008-2021. U.S. Department of Health and Human Services. 2023.

32. Pharmaceutical Strategies Group (PSG). 2025 State of Specialty Spend and Trend Report. 2025.

33. McAuliffe T, Salwen-Deremer JK, Siegel CA. Disparities in Access and Treatment for Rural Patients with Inflammatory Bowel Disease. Inflammatory Bowel Diseases. 2025; izaf090.

34. Wright GC, et al. Health Disparities in Rheumatology in the United States. Open Access Rheumatology: Research and Reviews. 2025; 17:1–15.

35. McGinley MP, Harvey T, Lopez R, Ontaneda D, Buchalter RB. Geographic Disparities in Access to Neurologists and Multiple Sclerosis Care in the United States. Neurology. 2024;102(4): e208072.

36. Palmer, Kaitlyn, et al. "Unique Health Care Delivery Considerations in Rural America." *International Journal of MS Care*, vol. 27, no. Theme, 2025, pp. T2–T6

37. US Health Care Disparities in Immunology Biologics Access: A Systematic Review. American Journal of Managed Care. 2025.