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The Modular Future of Hybrid Decentralized Clinical Trials

Why full decentralization stumbled, hybrid won, and how AMC Health powers the next decade as a modular operating partner.

Executive Summary:

Decentralized clinical trials (DCT) arrived with significant promise and considerable momentum. In the years following the pandemic, the industry moved quickly to virtualize trial activities. While this shift unlocked broader patient access, faster recruitment in select therapeutic areas, and the foundation for richer real-world data capture, the structural limitations of full DCTs became obvious. This forced the adoption of a hybrid model, which combined traditional site-based studies with digital and electronic tools.

The global DCT market is projected to reach $14.29 billion in 2026, growing at a 15.4% compound annual growth rate through 2035.[1] Within that growth story, however, fully decentralized designs account for only 10–15% of new studies. Hybrid trials, which combine site-based medical oversight with protocolized decentralized elements, now represent more than 70% of new studies.[2]

Why the disparity? The FDA's September 2024 Final Guidance has effectively codified a new reality: decentralized elements are permissible and valuable, but regulatory obligations for sponsors and investigators remain unchanged from traditional site-based studies.

Full decentralization shifts the compliance burden, often to operational layers that are not equipped to bear it. The enabling mechanism for hybrid is a modular operating partner: a clinical-grade layer that executes decentralized elements day-to-day without displacing investigator authority or CRO oversight.

In this white paper, we examine the structural, regulatory, and operational forces that have made hybrid the prevailing trial model. We also look at the emerging role of modular operating partners that are study-agnostic, protocol-aligned, and integration-first.

[1]Global Decentralized Clinical Trials Market Analysis, 2026 edition. Forecast period 2026–2035; North America largest market, Asia-Pacific fastest growing region (15.67% CAGR). Market value $14.29B (2026) projected to $51.71B (2035) at 15.4% CAGR.
[2]Hybrid trial adoption based on 2026 industry benchmarking. Hybrid models represent approximately 70–77% of new interventional studies; fully decentralized trials account for 10–15%. Source: Decentralized Trials & Research Alliance (DTRA) industry data and clinical trial registry analysis.

The DCT Landscape in 2026

The clinical trial industry has shifted permanently. What began as a pandemic-era necessity has matured into a redefined standard of operations, and the numbers reflect that transition.

Interventional trials account for approximately 63.7% of the global DCT market, while observational and expanded-access studies are steadily gaining share, driven by payer and regulator demand for real-world evidence and by growing patient advocacy for early treatment access.

Within that broader market, hybrid trials dominate the operational picture. More than 70% of new studies in 2026 incorporate hybrid design elements, while fully decentralized trials represent 10–15% of the total. Phase II and III programs, where patient engagement density and continuous data capture matter most, represent the strongest uptake.[3] Traditional site-based trials continue to decline as sponsors recognize the access, retention, and operational efficiency advantages of placing trial activities closer to patients.

Therapeutic adoption is concentrated where patient burden and geographic barriers are most acute: metabolic disorders, CNS conditions, oncology, and rare diseases. These are populations where site-based travel creates measurable dropout risk, and where continuous remote monitoring can generate longitudinal data that episodic clinic visits simply cannot.

Competitive Snapshot

The competitive landscape reflects this urgency.

IQVIA, with more than 500 active DCTs across 75 countries and recognition as a market leader in IDC MarketScape's 2024 assessment for DCT technologies, brings the world's largest CRO to bear on the space.

Medable has deployed its platform across nearly 400 decentralized and hybrid trials in 70 countries, serving more than one million patients.

Science 37, acquired by eMed Technologies in 2024, pioneered the siteless Metasite model and holds approximately 15% of the DCT market.

THREAD delivers configurable hybrid and fully decentralized platforms with real-time analytics to a rapidly expanding sponsor base.

[3]Decentralized Trials & Research Alliance (DTRA) industry data and clinical trial registry analysis

Against this field, AMC Health's differentiation is operational depth and precision governance: FDA Class II cleared patient platform, predictive AI, a nationwide virtual medical home network, and the posture to operate inside a sponsor's protocol. This includes running decentralized elements daily, without displacing investigator authority or CRO oversight.

Promise and Plateau: Why Full Decentralization Struggled

The case for decentralization was compelling in principle. By removing geographic barriers, meeting patients where they are, and capturing continuous data, organizations could reduce the burden that drives dropout. Those benefits came with friction. Three categories of challenge have emerged consistently across therapeutic areas and trial phases.

Structural and Ethical Tensions

Decentralizing logistics does not decentralize responsibility. The FDA has been explicit: investigators remain accountable for patient protection, protocol conduct, and informed consent regardless of whether activities occur at a clinical site or in a patient's home. Fully decentralized models often distributed those responsibilities in ways that made oversight diffuse and documentation difficult to audit. This is precisely the pattern that the September 2024 Final Guidance addresses.[4]

Informed consent, in particular, is not a one-time signature event. Under modern guidance, it is an ongoing, process-based interaction that begins at recruitment and continues through the patient's entire involvement. This requirement does not simplify when the patient is remote.

Operational Reality

Scoping reviews and national program assessments catalog the same persistent challenges across indications: retention at scale without adequate human contact; digital inequities in broadband access and device literacy; multi-vendor fragmentation that multiplies support burden; and a recurring paradox in which site coordinators who were supposed to be relieved by DCT infrastructure found themselves managing remote task follow-up and device troubleshooting instead.

These challenges recur across therapeutic areas and trial phases and represent a fundamental gap between what technology promises and what sustained clinical operations require.

[4]U.S. Food and Drug Administration. "Conducting Clinical Trials with Decentralized Elements: Guidance for Industry, Investigators, and Other Stakeholders." Final Guidance, September 18, 2024. Available at: https://www.fda.gov

Data Quality and System Maturity

The more measurement is distributed, the more heterogeneity enters the data stream. These take the form of timestamp inconsistencies, calibration variance across device fleets, missing observations, and accumulating outliers that go unchecked until someone addresses them. Remediation typically happens at database lock, which increases its cost. FDA guidance on decentralized elements explicitly calls for fit-for-purpose electronic systems and protocolized oversight to ensure integrity and auditability, requirements that a purely technology-forward platform rarely satisfies without a dedicated operational layer managing data quality in real time.

Independent peer-reviewed syntheses echo these themes. While DCT adoption grew rapidly in the post-pandemic period, methodology, terminology, and reporting remain inconsistent across the literature. Many published studies evaluate the DCT method itself rather than the investigational product, a signal that the industry is still consolidating best practices around what decentralized research actually requires.

The takeaway: clinical research is not merely a data problem. It is a problem of supervision, engagement, logistics, and data governance. Technology is necessary, but it is not sufficient in and of itself.

Critical Success Factors for Decentralized Trials

The NIH National Center for Advancing Translational Sciences (NCATS) identified seven factors essential to successful DCT implementation in its June 2024 report:[5]

1. Infrastructure & Technology Access
2. Workforce Training
3. Community Engagement
4. Partnerships with Local Providers
5. Patient Adherence
6. Privacy & Data Security
7. Data Integration

NCATS emphasized that underserved populations often lack the broadband access or digital literacy that DCT models assume, making equity a central design challenge, not a secondary consideration.

[5]National Center for Advancing Translational Sciences (NCATS), National Institutes of Health. Critical Success Factors for Decentralized Clinical Trial Implementation, June 2024.

The Regulatory Frame That Made Hybrid the Standard

The FDA's September 2024 Final Guidance on Conducting Clinical Trials with Decentralized Elements is a defining regulatory development in the DCT space in recent years. Its practical effect was to correct an assumption that had quietly distorted market expectations: that decentralization could dilute or redistribute regulatory obligations.

The guidance is unambiguous: FDA regulatory requirements are identical for trials with decentralized elements and those without. Sponsors and investigators cannot delegate clinical judgment, consent, or safety oversight to a technology platform, nor to an operational partner operating outside of clearly defined protocol roles. Again, full decentralization relocates compliance complexity.

Table 1: FDA 2024 Final Guidance: Key Requirements and DCT Implications

Requirement Area	Key Obligation	DCT Design Implication
Decentralized Elements	Telehealth, home visits, and local HCPs are permitted when meeting the same regulatory standards as site-based trials	All decentralized activities must be protocolized with defined roles and oversight mechanisms
Investigator Oversight	Sponsors and investigators must define delegated tasks and maintain clear accountability across decentralized partners	Operational partners operate within strict protocol-defined boundaries; investigators retain full authority
Remote Informed Consent	Permitted with IRB approval, secure audit-trailed systems, and verified patient understanding	Consent is a process that requires documented, ongoing interaction across all modalities

Requirement Area	Key Obligation	DCT Design Implication
Digital Health Technologies	Devices and platforms must be verified, validated, secure, accessible, and capable of generating regulatory-grade data	Platform selection is a compliance decision; FDA Class II clearance provides the strongest regulatory foundation
Data Integrity / 21 CFR Part 11	All electronic systems (eCRFs, eConsent, telehealth platforms, DHT data streams) must meet Part 11 requirements	Audit trails, access controls, and system validation are non-negotiable for every decentralized data stream
Safety Monitoring	Remote safety assessments must have reliable, documented escalation pathways for identifying and reporting adverse events	Protocol-defined nurse triage with documented escalation to site investigators is required
IP Management	Direct-to-patient shipping permitted with documented SOPs, tracking systems, and site-equivalent handling requirements	Investigational product logistics must be fully documented and auditable, regardless of delivery method

The guidance also reiterated a process-based standard for informed consent, with specific implications for any DCT platform that claims to manage the consent workflow independently. Consent is not a form completed at enrollment; it is a continuing interaction. This is precisely why investigator-anchored hybrid designs align more reliably with regulatory expectations than purely virtual models.

Data privacy obligations further complicate the compliance landscape. HIPAA's 2024–2025 updates strengthen cybersecurity requirements for covered entities, including technology asset inventories, encryption, multifactor authentication, and mandatory annual compliance audits. GDPR mandates data minimization, pseudonymization, and explicit consent for cross-border data transfers for any EU-facing trial. China and India require onshore servers and fragmented data pipelines, which add operational complexity to globally distributed studies.

The cumulative implication is that sponsors cannot decentralize their way out of regulatory complexity. Retrofitting to these requirements after the protocol is locked does not suffice; sponsors need to build an operational layer around them.

The Operational Reality of Hybrid Trials

Hybrid is not a compromise between decentralized and site-based trials. In reality, hybrid is a design framework for: 1) placing each trial activity where it can be executed most effectively; and 2) governing that placement with appropriate clinical oversight.
Some activities belong onsite. Complex procedures requiring specialized equipment, for example, or safety assessments requiring direct investigator evaluation. Also, any interaction where investigator judgment cannot be safely delegated.

Others benefit meaningfully from moving closer to the patient: follow-up visits, biometric monitoring, ePRO capture, telehealth continuity contacts between key assessments, and eConsent for eligible interactions. Placing those activities in patients' homes or local care settings reduces travel burden, increases assessment frequency, and generates continuous data that episodic clinic visits cannot replicate.

Telehealth, in this model, functions as a thread between visits. It helps sponsors and CROs maintain engagement with enrolled patients, enables early identification of safety signals, and supports ongoing consent processes that modern guidance requires. What telehealth cannot do is substitute for the investigator oversight that regulation preserves, regardless of the platform delivering it.

Hybrid shouldn’t be treated as a euphemism for offloading decentralized work onto site coordinators. That is the failure mode the industry has documented repeatedly; it stems from a structural gap in hybrid trial design. Decentralized elements require someone to run them daily, for example:

- Provisioning and troubleshooting devices
- Onboarding and supporting patients
- Conducting protocol-aligned outreach
- Triaging clinical escalations to site teams on defined safety triggers without making independent clinical judgments

Without a dedicated operational layer to carry this work, the burden shifts to sites and CROs, often causing the model to collapse under its own complexity.

A modular operating partner provides a clinical-grade operational layer that executes the decentralized elements a protocol defines, to the regulatory standard those elements require.

AMC Health: The Modular Operating Partner

AMC Health operates in the space between clinical trial sites and patients, executing decentralized elements to a clinical standard without displacing investigator authority or CRO oversight.

AMC Health's platform was designed with regulatory requirements in mind from the outset. The AMC CareConsole is FDA Class II cleared, meeting a standard of technical validation that distinguishes it from commercial telemedicine and consumer wellness platforms that may not meet the fit-for-purpose threshold now required by FDA guidance.

In addition, predictive AI and machine learning analytics surface patient risk signals in real time, enabling protocol-defined escalation before adverse events become reportable. Seamless EMR integration across Epic, Cerner, and Allscripts ensures that data generated in the decentralized layer flows into existing sponsor and CRO systems. It does so without requiring custom builds or data mapping workarounds.

Finally, automated patient health surveys and SDOH capture enrich the longitudinal dataset beyond what biometric monitoring alone provides.

AMC Health’s nationwide virtual medical home network adds a dimension that platform vendors typically cannot offer: on-the-ground nursing staff capable of supporting home assessments, sample collection, and care coordination at scale. This is the human infrastructure that NCATS identified as a prerequisite for DCT success, one that most platform-only vendors cannot replicate.

In practice, AMC's modular role within a hybrid program covers four operational domains:

Patient Enablement

- Device provisioning and replacement
- Patient onboarding and orientation
- Protocol-aligned outreach and reminders
- Ongoing engagement support that sustains adherence without burdening site coordinators

Clinical Triage

- Nurse-led monitoring that escalates to site investigators on protocol-defined triggers, documents the escalation pathway fully, and never extends into independent clinical decision-making or investigator-reserved activities

Data Orchestration

- Normalization of device and ePRO data streams, quality control, and structured feeds to sponsor and CRO EDC and CTMS systems in formats that reduce query burden at database lock

Governance Alignment

- Documented protocols for every decentralized activity
- Audit-ready operational records
- Clearly defined scope boundary that preserves investigator authority over consent, eligibility, and all medical decisions

The modular architecture means sponsors adopt only the capabilities their protocol requires. There is no platform commitment that displaces existing CRO relationships, and no operational scope that extends beyond what the protocol defines. Sponsors can direct AMC Health's capabilities at a single endpoint measurement or a full set of decentralized activities and scale across phases and geographies as study needs evolve.

NOTE: AMC's platform is currently optimized for US-based operations, with partial international reach. Third-party CTMS integration and full global regulatory compliance are active development priorities. Sponsors designing multi-country studies should factor this into scope planning.

The Business Case: Cost, Quality, and Speed

The financial logic of a modular hybrid approach rests on three compounding effects: preserved revenue from retained patients, avoided downstream data remediation costs, and accelerated timelines from cleaner data at database lock.

Retention

A fully decentralized Phase IV breast cancer trial conducted by Science 37 in partnership with a top-10 global pharmaceutical sponsor achieved a 96% patient retention rate. This represents an estimated 30% improvement over the approximately 70% retention rates typical in site-based oncology trials.[6]

Behind that number is something the operational metrics don't fully capture: patients with breast cancer who completed a complex oncology trial without repeated trips to a clinical site, and the ability to maintain continuity of care and participation through what, for many, was an already demanding period of treatment.

[6]Science 37 and top-10 global pharmaceutical sponsor, Phase IV breast cancer decentralized trial (2020). 96% patient retention vs. ~70% site-based oncology baseline; estimated 30% improvement. Reported in: Clinical Leader, "Decentralized Clinical Trials: Embracing the FDA's Final Guidance." https://www.clinicalleader.com/doc/decentralized-clinical-trials-embracing-the-fda-s-final-guidance-0001

The study leveraged telehealth, mobile nursing, and ePRO tools for all visits and data collection outside traditional sites, and demonstrated accelerated study startup timelines and reduced operational costs relative to historical benchmarks. Critically, the retention performance was a function not only of the technology deployed but of the operational infrastructure supporting patients day-to-day.

Return on Investment

Tufts Center for the Study of Drug Development analysis, conducted through the Partnership for Advancing Clinical Trials (PACT), indicates that decentralized trial elements can generate net financial benefits of 5 to 13 times the initial investment for Phase II and III studies. This equates to approximately $10 million ROI on a $500,000 Phase II investment and $39 million on a $1.5 million Phase III investment.[7] These are averages across programs; individual outcomes depend substantially on operational readiness and the fit-for-purpose nature of the infrastructure deployed. That variable is what a modular operating partner directly controls.

At scale, even modest improvements in patient retention and reductions in missed protocol assessments translate to six to seven figures in avoided replacement costs, protocol rework, and additional monitoring visits. Data quality addressed at the point of collection, through normalization, plausibility checks, and real-time monitoring, reduces CRO query volumes at database lock and advances the lock timeline. In time-sensitive programs, a one- to two-week earlier lock can meaningfully shift downstream regulatory milestones.

The Modular Advantage

Fully decentralized models frequently over-procure and under-resource the day-to-day operational support that makes the model function. A modular hybrid approach deploys only the capabilities the protocol requires, prevents unnecessary dispatches through nurse-led triage, and applies data quality controls continuously rather than as a rescue operation at lock.

[7]Partnership for Advancing Clinical Trials (PACT) / Tufts Center for the Study of Drug Development. "New Research Indicates Decentralized Clinical Trials Exceed Timeline Expectations." Pharmaceutical Technology, 2023. https://www.pharmaceutical-tech.com/news/new-research-from-partnership-for-advancing-clinical-trials-pact-indicates-decentralized-clinical-trials-dcts-exceed-timeline-expectations

Government and peer-reviewed analyses consistently report that DCT costs and benefits are highly heterogeneous, and that outcomes depend on fit-for-purpose methods and operational infrastructure. The financial case for hybrid depends on the operational layer being appropriately resourced and governed.

Compliance Clarity by Design

A hybrid model only scales reliably if it reduces regulatory exposure rather than creating new categories of it. AMC Health's operating posture is built around that premise.

Investigator authority is preserved at every point of contact. AMC does not recruit patients, determine eligibility, obtain informed consent, or make clinical decisions. These duties remain with the investigator, as required by FDA guidance and applicable regulations. AMC's operational scope is defined in the protocol, documented in study records, and auditable at every step.

Informed consent is treated as a process. Remote interactions are designed to reinforce the ongoing consent process required by modern guidance. Where VA research applies, AMC's operational framework accommodates VHA Directive 1200.05 and VA HRPP oversight requirements from the outset.

All electronic systems used in decentralized activities are validated for compliance with 21 CFR Part 11. Audit trails, access controls, system documentation, and data integrity requirements are built into operational workflows. This is the difference between citing regulatory compliance as a platform feature and demonstrating it through documentation that survives an FDA inspection.

A Sponsor's Decision Framework

Before incorporating decentralized elements into a protocol, sponsors and CROs should work through four foundational questions. The answers determine whether a hybrid study delivers on its operational promise or replicates the fragmentation and compliance risks that fully decentralized designs have repeatedly documented.

1. **Which activities genuinely benefit from proximity to the patient and which require onsite infrastructure, specialized equipment, or investigator judgment that cannot be safely delegated?** This question shapes protocol design before any technology decision is made, and it is the one most often skipped in the rush to adopt DCT tools.

2. **What infrastructure supports those decentralized elements, and who runs it day to day?** Identifying the operational layer that will manage device provisioning, patient support, clinical triage, and EDC/CTMS data feeds, before a study begins, is as critical as platform selection.

3. **What are the data implications, and are the systems fit for purpose under FDA guidance?** Normalization, audit trails, device fidelity, and plausibility checking are not implementation details. They determine whether decentralized data is usable at database lock.

4. **How is informed consent protected as an ongoing process across remote and site-based interactions?** Sponsors should be able to articulate, at the protocol level, how continuous consent is maintained across all modalities used in the study.

Conclusion

The fully decentralized ideal exposed the limits of what technology can carry alone. Hybrid has emerged as the durable operating model because hybrid is what properly designed and governed clinical research looks like in practice. Site-anchored oversight, patient-proximate activities, and a dedicated operational layer running the decentralized elements in between: this is the architecture FDA guidance describes and that maturing evidence practically requires.

AMC Health provides that operational layer through FDA Class II-cleared technology, a nationwide virtual medical home network, predictive analytics, and a governance posture that maintains investigator authority while executing the day-to-day work that enables hybrid trials to function at scale.

Sponsors and CROs must now determine which elements to decentralize, who will run them to a clinical and regulatory standard, and what infrastructure will make the whole model auditable from first patient enrolled to database lock.

That is the problem AMC Health is built to solve.

To learn how AMC Health can serve as the modular operating partner for your next hybrid study, contact the clinical trials team or visit www.amchealth.com.

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