Worldwide Clinical Trials

Modernizing IP Management: Pharmacy's Role in Data Integrity and Compliance

Matthew Confeld, PharmD, PhD, Director, Clinical Research Methodology
Nishi V Soni, Associate Director, Pharmacy Operations
Tamika Silva, Clinical Research Pharmacist Trainee

The finalization of ICH E6 (R3) signaled a pivotal moment in global Good Clinical Practice (GCP). More than an incremental revision, it established a modernized framework for investigational product (IP) management, encompassing storage, distribution, monitoring, and documentation. To fully appreciate its impact on pharmacy operations, it's essential to revisit the foundation: Who is the ICH? What is E6? Why was it updated — and, most importantly, why does it matter to us?

Who Are the ICH?

The International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use (ICH) is a global consortium that unites regulatory authorities such as the U.S. FDA, European Medicines Agency (EMA), and Japan's PMDA with the pharmaceutical industry. Its mission is simple yet far-reaching: to harmonize global standards for drug development, ensuring that safe, effective, and high-quality medicines can reach patients more efficiently.

What is ICH E6?

ICH E6 is the Guideline for GCP, first introduced in 1996. It established a unified ethical and scientific framework to ensure that the rights, safety, and well-being of clinical trial participants are protected, while ensuring that trial data are credible and reliable. The most recent revision, ICH E6 (R3), was adopted in January 2025 and finalized later that year by major regulatory agencies, including the FDA. This landmark update replaces the earlier E6 (R2) version and reflects the modern realities of clinical research by incorporating risk-based quality management, digital data integrity, and decentralized trial models.

Why It Matters for Pharmacy

ICH E6(R3) may focus on sponsors and investigators, but pharmacy teams carry critical responsibilities. By improving documentation, traceability, and adopting risk-based approaches to product management, pharmacies help safeguard integrity, protect participants, and maintain compliance.

The Risk-Based Approach

ICH E6(R3) emphasizes a quality-by-design and risk-based approach to trial conduct, including IP management. If ICH E6 (R3) is the rulebook, then the Standard Operating Procedures (SOPs) are the playbook. This revision marks a clear shift from rigid compliance to risk-based, quality-driven oversight. Pharmacy operations should reflect this by moving beyond simply following and documenvting procedures to scaling SOPs to the level of study risk — for instance, distinguishing between first-in-human versus late-phase trials, or between complex reconstitution and dispensing of a marketed product.

Management of IP

Quality Management: A Risk-Based Approach

Most importantly, E6 (R3) reinforces a "fit-for-purpose" mindset. Pharmacies and trial sponsors are expected to tailor their controls and documentation to the complexity and risk of the study, rather than adhering to a one-size-fits-all model.

In an early phase or first-in-human trial, the pharmacy's risk-based focus might center on dose preparation accuracy, timing of administration, and documentation of blinding or randomization procedures, rather than complex product handling. For instance, in a single-dose pharmacokinetic study, key risks may include ensuring that the correct participant receives the proper treatment at the correct time, maintaining a chain of custody for test and comparator products, and recording dosing events in real-time. Even though IPs, such as oral solids or liquid orals, themselves may be low risk, the timing, labeling, and data integrity surrounding administration are critical to the validity of study outcomes.

Digital Traceability & Availability

The new framework also highlights the importance of digital traceability. The digital transformation of clinical research has prompted the expansion of the foundation of data integrity in ICH E6 (R3). Electronic inventory systems, remote temperature monitoring tools, and validated electronic signatures can now serve as compliant tools for maintaining audit trails. For instance, a digital chain-of-custody platform can automatically log when a product leaves the depot, when it is received by a local pharmacy, and when it's ultimately delivered to the participant — all without the delays or transcription errors common in older manual systems.

This enhanced framework acknowledges that data must not only be accurate but also complete across its lifecycle and accessible for regulatory review. While E6 (R2) referenced the ALCOA principles: Attributable, Legible, Contemporaneous, Original, and Accurate — the updated guideline extends these to ALCOA+, adding Complete, Consistent, Enduring, and Available. For example, a pharmacy using an electronic IP management system must ensure that every entry (receipt, dispensing, return, or destruction) is time-stamped, linked to the responsible individual, and preserved in a secure, retrievable format.

E6 (R3) also encourages the use of interoperable electronic systems that allow for real-time analytics and centralized data monitoring to detect issues before they escalate. In contrast, E6 (R2) utilized on-site monitoring visits, which often led to delayed issue identification and redundant data checks. The R3 model is designed to foster a culture of continuous improvement, where trends are tracked, preventive actions are documented, and quality is built into the process, rather than being inspected after the fact.

Decentralized Models

ICH E6(R3) marks a turning point in how IPs are managed across the clinical trial lifecycle. The guidance encompasses decentralized trial models, where IP no longer has to be administered exclusively through a single central pharmacy or investigator site. Trials may now ship IP directly to participants, dispense through satellite or community pharmacies, or be managed by home health professionals under protocol-defined oversight. This shift reduces logistical strain on participants, particularly in long-term or chronic disease studies, and promotes equity in access by accommodating those who live far from major research centers.

Aspect	Previous Approach (E6 R2)	E6 R3 Approach	Pharmacy Impact
Distribution Path	IP distributed only through investigator site or main trial pharmacy	Allows multi-site, hybrid, or direct-to-participant shipping through local or partner pharmacies	Pharmacies must define oversight for local, satellite, and home delivery models. Update chain-of-custody SOPs
Accountability Systems	Manual logs or semi-automated spreadsheets maintained at each site	Digital accountability platforms, blockchain tracking, and validated e-logs permitted for full traceability	Transition to electronic IP ledgers; ensure audit-ready digital records and staff training on data entry and verification
Temperature & Storage Control	At minimum, manual logs with processes for documenting excursions	Continuous, remote temperature monitoring with alarm alerts and real-time dashboards encouraged	Implement automated data loggers and excursion response workflows
Participant Access	Required to visit site for every dispensing or return	Supports decentralized models with courier delivery or local pharmacy pick-up	Develop local dispensing agreements, participant verification steps, and return logistics
Audit trail & Documentation	Focused on presence of required forms ("essential documents")	Focused on traceability of process: who did what, when, and under what oversight; electronic signatures accepted	Pharmacy must maintain metadata (date/time/user)
Risk Management	Same level of documentation regardless of study risk	"Fit-for-purpose" and risk-proportionate controls based on IP complexity and trial design	Apply tiered SOPs: simple workflows for oral agents; intensive oversight for biologics or temperature sensitive IPs
Monitoring & Oversight	On-site monitor reviews physical binders	Remote and central monitoring with electronic access to logs and storage data	Prepare to grant auditors controlled e-access; ensure logs are current and reconcilable in real time

Critical to Quality Starts in the Pharmacy

For pharmacies, shifting to E6 (R3) is more than a regulatory mandate, it is a cultural mindset. Fostering continuous improvement and data transparency. Pharmacies must invest in digital tools, staff training, and risk-based SOP development to meet expectations for accountability and audit readiness. By aligning operations with E6 (R3), pharmacy teams become innovation leaders, driving progress while ensuring that patient safety remains at the heart of every trial.

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