

How Pharmaceutical Packaging Has Changed — And What It Means for Today's Brands

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For decades, pharmaceutical packaging was a highly standardized, tightly regulated discipline defined by child-resistant caps, amber vials, blister packs, and strict FDA labeling requirements. But the last 10–15 years have brought more change to this sector than the previous 50. Driven by globalized supply chains, e-commerce, sustainability demands, serialization laws, and shifting consumer expectations, pharmaceutical packaging is undergoing a structural transformation.

As a firm with more than 35 years in global packaging, **Packaging Resources** has seen this evolution firsthand. Here is how pharmaceutical packaging has changed—and what the future demands from brand owners, manufacturers, and distributors.

1. From One-Size-Fits-All to Patient-Centric Design

Historically, pharmaceutical packaging was engineered primarily for compliance and protection. Today, it must also enhance the *user experience*.

Key patient-driven shifts include:

- **Easy-open, senior-friendly closures** replacing overly complex child-resistant systems
- **Intuitive labeling and icons** for multilingual and low-literacy populations
- **Calendarized blister cards** to improve adherence for daily/weekly dosage
- **Color-coding systems** to reduce medication errors in multi-drug regimens

Pharma brands are now expected to balance safety with usability—a shift driven by aging populations, home self-care, and the growth of chronic disease management.

2. The Rise of Smart and Connected Packaging

Digitization has reached blister packs, bottles, and cartons.

Examples of technology now entering mainstream use:

- **NFC-enabled bottles** providing authentication and refill reminders
- **Temperature-logging labels** for biologics and cold-chain pharmaceuticals

- **QR-based patient portals** linking packaging to digital instructions, videos, and prescription tracking
- **Embedded sensors** that detect tampering or track adherence

Smart packaging does more than protect—it integrates pharmaceuticals into the digital healthcare ecosystem. For consumers managing complex therapies, this is becoming an expectation, not a novelty.

3. Serialization and Track-and-Trace Requirements

Global anti-counterfeit laws—particularly the U.S. Drug Supply Chain Security Act (DSCSA) and Europe’s Falsified Medicines Directive (FMD)—have completely reshaped pharma packaging.

What’s changed:

- **Every saleable unit now requires a unique serial number**
- **Manufacturers must manage full supply-chain traceability** from plant to pharmacy
- **2D barcodes and digital verification features are mandatory**

Serialization has forced upgrades in printing technology, inspection systems, data management software, and carton design. For OEMs and packagers, it is one of the most transformative regulatory shifts in history.

4. Major Growth in Cold-Chain and Biologic Packaging

As biologics, mRNA treatments, and temperature-sensitive drugs grow, cold-chain packaging has exploded.

Modern cold-chain improvements include:

- **Vacuum-insulated panels (VIPs)** replacing EPS foam
- **Phase-change materials (PCMs)** enabling longer shipping durations
- **Reusable and returnable thermal shippers** for sustainability
- **More robust temperature logging and condition monitoring**

The pandemic accelerated these innovations, pushing the industry toward faster development cycles and more precise thermal engineering.

5. Sustainability and Regulatory Pressure Are Rewriting Material Choices

While pharma has historically been slow to change materials due to strict validation requirements, sustainability is now unavoidable.

Key material shifts include:

- **PCR (post-consumer recycled) resins** in bottles and secondary packaging
- **Mono-material blisters** using PP/PP or PET/PET instead of PVC/aluminum
- **Elimination of multi-layer laminations** that hinder recyclability
- **Lightweighting** of bottles, caps, and cartons
- **Higher demand for compostable or paper-based secondary packaging**

Brand owners must now hit environmental goals without compromising safety, shelf life, or regulatory compliance—a complex balancing act that Packaging Resources helps navigate.

6. E-Commerce and Direct-to-Patient Distribution

Online pharmacies, telemedicine, and subscription drug services have reshaped packaging logistics.

What e-commerce has driven:

- **Stronger ship-ready packaging** designed to prevent leaks and crushing
- **More robust tamper-evident features** for mailed prescriptions
- **Cold-chain shippers optimized for last-mile delivery**
- **Smaller, modular pack sizes** for home delivery instead of pharmacy shelves

This shift requires packaging engineered for the rigors of UPS, FedEx, Amazon, and regional courier systems—not just pharmacy display.

7. A Broader View of Safety and Compliance

Pharmaceutical packaging now incorporates a wider range of safety expectations:

- **Improved anti-counterfeit measures** (holograms, microtext, covert inks)
- **Enhanced tamper-evident systems** beyond basic shrink bands
- **Clearer allergen and interaction warnings**
- **Standardized global labeling formats** for international distribution

The regulatory environment has become more complex, and packaging must adapt quickly.

What This Means for Pharmaceutical Brands

Pharmaceutical packaging is no longer just a vessel—it is a functional part of the therapy. To stay competitive, companies must invest in:

- Human-centered design
- Smart packaging technology
- Serialization and compliance upgrades
- Cold-chain engineering
- Sustainable materials and recyclability
- E-commerce-ready protection and tamper systems

At **Packaging Resources**, we help pharmaceutical manufacturers, distributors, and brand owners future-proof their packaging—balancing innovation, compliance, cost efficiency, and supply-chain practicality.