

## What the Injectables Surge Is Really Asking of Pharmaceutical Packaging

The scale of the GLP-1 market is well understood by anyone working in pharmaceutical manufacturing. Semaglutide and tirzepatide, at least in the context of weight loss, have moved from a clinical curiosity to global phenomenon in a remarkably short period. The pipeline behind them, including further obesity treatments, next-generation autoinjectors, and expanded indications, shows no sign of slowing. For packaging professionals, the interesting question is not whether this growth will continue, but what that growth is actually demanding in practical terms from secondary packaging design, production infrastructure and patient communication.

The answer, on close examination, is rather a lot, and much of it is genuinely new. This is not because injectables are new, but because the combination of speed-to-market pressure, mass consumer adoption of self-administration, and tightening regulatory expectations around security and sustainability, has created a set of simultaneous demands that packaging has not previously had to meet all at once.

The market context reveals the stakes. The global biopharmaceutical market is projected to reach \$856 billion by 2030 according to Precedence Research, expanding at a CAGR of 12.5%, and prefilled syringes represent one of the fastest-growing delivery segments within that. The figures illustrate a mainstream shift in how medicines are delivered, and one that places packaging at the centre of a very large commercial and clinical equation.

### Speed to Market as the Primary Pressure

The pace at which GLP-1 therapies have reached market has been extraordinary. Commercial timelines have compressed what would previously have taken years of packaging development and line qualification into months. That compression has had real consequences: pharmaceutical manufacturers have had to adapt packaging lines rapidly, often before ideal specifications have been fully locked down, and in some cases before packaging suppliers have had adequate time to test and validate components against machine performance.

This is where the relationship between manufacturer and packaging partner becomes extremely consequential. A supplier that can test carton designs directly on machine suppliers' own infrastructure, validate performance at commercial speeds before launch, and iterate formats quickly in response to line feedback, is going beyond a commodity service. It is providing a development partnership that has direct bearing on when a product reaches patients. For the GLP-1 market specifically, where demand has consistently outpaced supply at various points, every week matters. Packaging that delays qualification or causes line stoppages is not acceptable.

The speed pressure is unlikely to ease. As competition intensifies and manufacturers race to establish solid market position for follow-on treatments, the expectation that packaging can be specified, validated and scaled quickly, will only increase.

### Designing for Patients Who Are Not Patients in the Traditional Sense

GLP-1 therapies have introduced a population of self-injecting patients who are largely new to the experience.

Unlike patients managing chronic conditions such as diabetes or rheumatoid arthritis, who typically receive structured clinical training before self-administration begins, many GLP-1 users are initiating treatment with limited hands-on guidance and a high expectation of intuitive usability. The packaging is, in many cases, the primary interface between the product and the patient at the moment of first use.

This changes the overall design brief in a very meaningful way. Secondary packaging for autoinjectors must provide immediate, unambiguous access to the device and any required auxiliary components. Top-opening carton designs have become increasingly important here: a pack that enables a patient to lift a flap and see all components clearly positioned, in the correct sequence, with the device oriented for immediate use, reduces the cognitive burden at a moment when errors carry clinical risk. The physical interaction with the pack is part of the treatment experience,

and poor design has consequences for adherence.

Protection during transport is equally important. Autoinjectors that activate within the packaging, whether due to compression, impact, or thermal stress in transit, represent a product integrity failure with direct patient safety implications. Carton engineering must account for the specific activation force thresholds of each device, and packaging must be validated against realistic distribution conditions, rather than just static testing. As more GLP-1 treatments move into direct-to-patient delivery models, the range of transit environments that secondary packaging must survive is widening considerably.

### Instructions for Use:

#### The Case for Going Beyond the Leaflet

Self-administration places a heavier burden on instructions for use (IFU) than clinic-administered treatments. The patient leaflet remains a regulatory requirement, but its limitations for a population of first-time self-injectors are real. Print instructions, however clearly written, cannot demonstrate injection technique, cannot update in response to revised guidance, and cannot confirm whether a patient has actually read and understood them.

This is where NFC-enabled (Near-Field Communication) secondary packaging offers a practical alternative. A tag embedded in a carton or label could deliver, for example, a video demonstration of injection techniques, step-by-step digital IFUs in the patient's language, dosing reminders, or direct links to support resources, all via a standard smartphone with no app required. For patients with visual impairments or low health literacy, audio-guided instructions delivered this way can be the difference between successful self-administration and a medication error.

The case for digital IFU integration is not purely patient-facing. As regulators in several markets move toward accepting or encouraging digital alternatives to printed leaflets, the ability to update guidance without a packaging change provides manufacturers with major flexibility. For products with

evolving usage guidance, that flexibility has real commercial and compliance value.

### Security Demands for High-Value, High-Visibility Products

The commercial profile of GLP-1 therapies makes them a prime target for counterfeiters. High price points, strong consumer demand, and widespread media coverage have created exactly the conditions that attract counterfeit activity, and there is already evidence of falsified GLP-1 products entering markets where legitimate supply has been constrained. The World Health Organization estimates that around 10% of medical products in low- and middle-income countries are substandard or falsified, and high-demand branded injectables are disproportionately represented in that figure.

Effective product security for injectable packaging requires layered thinking. A single tamper-evident seal is a minimum standard, not a deterrent. The more robust approach combines, or better still layers, security features. This includes visual indicators such as tamper-evidence and holographic elements, semi-visible security printing and microtext that require specialist capability to reproduce, and covert features including serialised data matrix codes, RFID tags and encrypted NFC, which enable verification at any point in the supply chain. Each layer addresses a different attacker capability; the combination creates a defence substantially harder to replicate in its entirety than any individual feature.

Serialisation, mandated under the EU Falsified Medicines Directive and the US Drug Supply Chain Security Act, provides the foundational digital layer. Compliance with these frameworks should be understood as baseline for market entry, not the ceiling. For products with the risk profile of high-demand GLP-1 injectables, the business and patient safety case for going further is very strong.

### Multi-Dose Formats and the Coming Returns Question

As GLP-1 therapies develop, multi-dose formats are becoming more prevalent. Weekly injection regimens delivered via multi-use pens require packaging that accommodates reclosure between doses, maintains product integrity across multiple openings, and remains patient-friendly throughout a treatment period that may span months.

Packaging that needs to repeatedly open and close securely, is a more challenging



specification than single-dose formats, and one that rewards close collaboration between the packaging design team and the device manufacturer.

Looking further ahead, the global sustainability agenda is raising questions about end-of-life responsibility for autoinjector devices and their packaging. Several European markets are moving toward requirements for device disassembly and component recycling, which will have implications for how secondary packaging supports the returns and disposal process. Packaging that supports correct separation of device components, or that incorporates return instructions and mechanisms as part of its design, is likely to become a regulatory expectation rather than a voluntary commitment within the current decade. Manufacturers specifying packaging now for products with long commercial lives would be wise to consider how those packs will perform against future sustainability obligations.

### The Sum of the Demands

Taken individually, none of the requirements explored here is without precedent. Speed-to-market pressure, patient-centric design, digital IFUs, product security and sustainability have all been on the pharmaceutical packaging agenda for years. What the GLP-1 wave has done is collapse them into a single, simultaneous specification challenge, at a scale and pace the industry has not previously encountered.

Meeting that challenge requires packaging partners who can engage across all of these

dimensions without treating any of them as secondary. A carton that protects the device, guides the patient, deters the counterfeiter, carries digital content and accommodates a future returns process is not a simple deliverable, but the result of genuine technical investment across multiple disciplines, tested against real production and distribution conditions, and developed in close collaboration with the manufacturer.

The GLP-1 market has been, in many respects, a stress test for pharmaceutical packaging. The industry has largely passed it, but the question now is whether the lessons learned at pace, and under pressure, will be applied more systematically as the next wave of high-demand self-injectable therapies follows.



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