MARKUS ELFINGER & DAVID KUCH
Hermes Pharma


stock.adobe.com/Anna

Safety Meets Accessibility: Creating the Ideal Packaging for On-The-Go Dosage Forms

Balancing safety and convenience, innovative stick pack designs offer a patient-centric solution for on-the-go dosage forms.

Patient-centric innovation is reshaping our industry, with its influence extending beyond formulations to encompass thoughtful packaging design. This holistic approach aligns with evolving consumer expectations—today's patients demand medications and supplements that are not only effective and safe, but also convenient and quick to use. Design considerations, such as the need for portability, ease of use, and accessibility for diverse populations (including the elderly) underscore the importance of thoughtful packaging design.

Stick packs containing orally disintegrating granules (ODGs) have emerged as an innovative solution to address these design considerations. ODGs are a novel dosage form comprising fine granules or powders that can be poured directly into the mouth without the need for water, offering "on-the-go" convenience and immediate administration. Furthermore, end-users perceive ODGs to be fast-acting. By eliminating traditional swallowing barriers and seamlessly integrating into daily routines, ODGs in stick packs deliver a user-friendly experience.

However, packaging design must balance multiple competing demands: ensuring child resistance, enabling easy access for those with reduced dexterity, such as the elderly, and maintaining product stability and integrity. With thoughtful design and the right opening mechanism, stick packs can excel in meeting all these demands. Here we discuss how innovative packaging like stick packs can help healthcare companies meet the needs of modern consumers.

TAKING A PATIENT-CENTRIC APPROACH

Taking a patient-centric approach to pharmaceuticals requires understanding current market dynamics and user challenges. Traditional solid oral dosage forms, particularly tablets and capsules, have long dominated the market. Tablets alone held a 53.1% share of the pharmaceutical market in 2021[1] and over 32% of the nutraceutical market in Europe in 2023.[2] However, these traditional dosage forms present significant challenges for many users, including those with swallowing difficulties—a problem that affects more than half of the population and spans across all age group.[3] As the global population continues to age, the natural weakening of swallowing muscles over time makes dysphagia increasingly prevalent, further highlighting

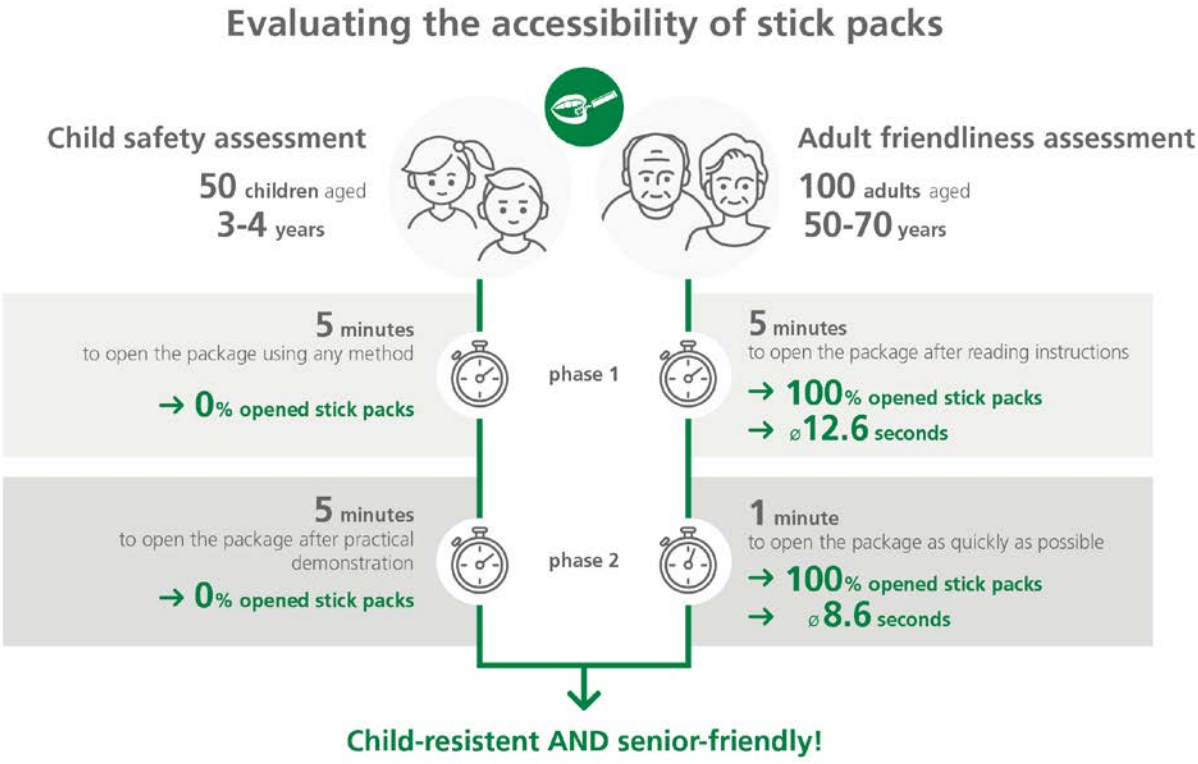

Figure 1. Infographic illustrating the successful evaluation of stick pack child safety and adult accessibility

the need for better alternatives to tablets and capsules.

In response, the market is moving away from these traditional formats towards user-friendly and convenient-to-take dosage forms, reflecting a broader transformation in healthcare consumption. This shift addresses both medical needs and changing patient preferences. Modern, health-conscious consumers think holistically about their wellbeing and take a proactive approach to illness prevention. They are increasingly turning to over-the-counter (OTC) options and often consider visiting their doctor as a last resort. In 2025, the global OTC pharmaceuticals market is projected to generate a revenue of $211.80 billion ($74.13bn in EMEA), and this market is expected to experience an annual growth rate of 4.84% (CAGR 2025-2029).[4]

These engaged consumers demand products that not only support their health goals but also fit seamlessly into their lifestyles, prioritizing formats that offer convenience without compromising on safety or efficacy.

The convergence of health-conscious consumerism, aging populations, and demands for convenience has accelerated innovation in user-friendly dosage forms. In particular, ODGs have gained significant traction in the European markets. This versatile format serves several therapeutic areas including pain relief, digestive health, and vitamin supplementation. The release profile can be customized for either immediate release (for fast-acting painkillers, for example) or slow release if the API must be available over a prolonged period. Their water-free administration, single dosing and pleasant flavor options provide practical advantages for users. For pharmaceutical companies, this format offers opportunities to extend product life cycles and differentiate from competitors through innovation. However, realizing the full potential of this innovative dosage form depends heavily on packaging design.

STICK PACKS: REIMAGINING PHARMACEUTICAL PACKAGING

Stick packs have emerged as the standard packaging format for ODGs, characterized by their long, slender shape that distinguishes them from traditional sachets. While their sleek profile may appear simple, the design represents a careful balance of technical and practical considerations. Material selection ensures essential barrier properties to protect the contents from light and moisture. Their compact form makes them highly portable, fitting easily into pockets or bags for on-the-go use.

Beyond their functional design, stick packs offer considerable flexibility in presentation, with customizable options including dimensions, printing, and metallic finishes that allow brands to reflect product identity while enhancing consumer appeal. More fundamentally, they deliver crucial benefits for both manufacturers and users: their pre-dosed delivery system guarantees accurate administration while enabling safe storage of APIs and nutrients until the point of use. This precision is particularly valuable for users managing multiple medications, where clarity

stock.adobe.com/Iryna Petrenko

and accuracy are essential. Combined with their exceptional portability, stick packs provide active consumers with reliable, convenient access to their medications throughout the day.

SAFETY AND ACCESSIBILITY: THE DUAL MANDATE OF MODERN PACKAGING

Safety remains paramount in pharmaceutical and nutraceutical packaging design. Child-resistant packaging plays a critical role in preventing accidental ingestion, as even small quantities of medication can have serious consequences if accessed by children. However, packaging must simultaneously remain accessible to all adult users, including the elderly and those with dexterity challenges to avoid issues such as missed doses or non-compliance. This balance between safety and accessibility presents a significant challenge in the pharma industry.

The concept of child-resistant packaging was first introduced in the U.S. with the "Poison Prevention Packaging Act" (PPPA) of 1970. Since its adoption, the rate of accidental ingestion of potentially hazardous products by children under five years old has fallen, a testament to the effectiveness of such measures.[5]

International standards like ISO 14375:2018 and the U.S. regulation 16 CFR § 1700.20 provide comprehensive guidelines and testing procedures for child-resistant, non-resealable pharmaceutical packaging such as stick packs. ISO 14375:2018 defines child-resistant packaging as a barrier to prevent children under five years old from accessing potentially dangerous products while ensuring accessibility for adults. Compliance testing uses harmless substances such as sucrose or placebos to assess packaging design and functionality safely.

Stick packs exemplify how modern packaging can address this dual mandate, combining child safety with accessibility to meet the needs of both vulnerable children and the adults administering medications.

CASE STUDY: EVALUATING THE ACCESSIBILITY OF STICK PACKS

At Hermes Pharma, ODGs are packaged—amongst other foils—in laminated aluminum PET foil stick packs with a laser-cut opening mechanism designed for ease of use. We needed to assess the accessibility and child-resistant qualities of these stick packs in accordance with ISO 14375 and US 16 CFR § 1700.20. To validate both the accessibility and child-resistant qualities, comprehensive testing was conducted by an independent institute (VerpackungsMarktforschung (ivm) GmbH). The study examined stick packs measuring 22 x 76 mm with a specialized laser-cut opening mechanism.

Test 1: Child safety assessment

Method: Testing was conducted in Germany in environments familiar to the participants. The study included 50 children aged 42-51 months, with equal gender representation. Each child was given five minutes to attempt opening the package using any method they could devise, though tools were not provided.

After five minutes, the children who were unsuccessful in opening the package were given a practical demonstration of the opening procedure. They were then given a further five minutes to try to open the package

Results: Zero openings were registered in the first five-minute test (prior to the demonstration) and zero openings were registered in the full ten-minute test. These results exceeded the requirements of ISO 14375 (2018), which allows for up to 15% successful openings before demonstration and 20% after demonstration.

Conclusion: The stick pack with the laser-cut design does comply with the child test requirements of ISO 14375 and US 16 CFR § 1700.20.

Test 2: Adult accessibility study

Method: The adult testing phase involved 100 participants aged 50-70 years (70% female, 30% male). The participants were given instructions in writing and the supervisor did not demonstrate how to open the package. A period of five minutes was given for the participants to familiarize themselves with the package and then attempt to open it correctly. Test participants were not allowed to consult either the supervisor or other participants in the test. Participants who successfully opened the package within the five minutes were given a second identical package and were requested to open it as quickly as possible. One minute was given for the participants to open the new package.

Results: All participants (100%) successfully opened the stick pack in both attempts. The average opening time improved from 12.6 seconds in the first attempt to 8.6 seconds in the second attempt, demonstrating quick learning and ease of use. These results surpassed ISO 14375 requirements, which permit up to 10% unsuccessful openings.

Conclusion: The stick pack with the laser-cut design does comply with the adult test requirement of US 16 CFR § 1700.20 and ISO 14375.

KEY FINDINGS

The laminated aluminum PET foil stick packs with specialized laser-cut opening design met all requirements of ISO 14375 and US 16 CFR § 1700.20, achieving the critical balance between child resistance and senior adult accessibility. These results validate their suitability for pharmaceutical and nutraceutical applications where both safety and user-friendliness are essential.

INNOVATION IN PATIENT-CENTRIC PHARMACEUTICAL DELIVERY BLENDS ACCESSIBILITY WITH SAFETY

The future of pharmaceutical and nutraceutical delivery lies at the intersection of safety, accessibility, and patient-centric innovation. As consumer and patient expectations evolve, the importance of convenient, user-friendly dosage forms has become paramount. Products that can seamlessly integrate into daily routines while eliminating common barriers to use—such as swallowing discomfort, difficulties opening the packaging, or the need for water—are increasingly valued by end-users and healthcare providers alike. However, realizing these benefits requires excellence in both formulation and packaging design.

In addition, international standards for pharmaceutical packaging have become increasingly rigorous, demanding solutions that protect children while remaining accessible to adults across all age groups and physical capabilities. The testing protocols required by ISO 14375:2018 and US 16 CFR § 1700.20 reflect this complexity, evaluating both resistance to child access and ease of adult use under real-world conditions.

As demonstrated through the case study, stick packs can successfully meet these demanding requirements. Through careful engineering of materials and opening mechanisms, such as a specialized laser-cut opening mechanism, they provide an effective barrier against child access while ensuring that adult users—including the elderly—can reliably access their medications. The quantitative improvements in opening times between the first and second attempts further highlight how intuitive these designs can be for adult users.

These results have significant implications for pharmaceutical and nutraceutical delivery. By providing packaging that demonstrably meets safety requirements while supporting consistent, reliable access, stick packs help address key challenges in modern healthcare delivery. Their success in balancing these competing demands provides valuable insights for future packaging innovation across the industry. **CP**

References

1. *Fact.MR Report: Oral Solid Dosage Pharmaceutical Market https://www.factmr.com/report/oral-solid-dosage-pharmaceutical-market Accessed 14/01/25*
2. *Grand View Research Report: Europe Dietary Supplements Market Size, Share & Trends Analysis Report 2024-2030 https://www.grandviewresearch.com/industry-analysis/europe-dietary-supplements-market-report Accessed 14/01/25*
3. *Market Study Summary: A Hard Truth to Swallow? https://www.swallowingtablets.com/ Accessed 23/01/25*
4. *Statistica Market Insights: OTC Pharmaceuticals https://www.statista.com/outlook/hmo/otc-pharmaceuticals/worldwide*
5. *ISO 14375:2018 Child-resistant non-reclosable packaging for pharmaceutical products — Requirements and testing https://www.iso.org/obp/ui/en/#iso:std:iso:14375:ed-1:v1:en Accessed 14/01/25*

MARKUS ELFINGER is senior director business development, account management and marketing at Hermes Pharma. A pharmacist with a Ph.D. in pharmaceutical technology, he has been with the company for over a decade, gaining extensive industry expertise and advancing through key roles in business development, alliance management, and sales before assuming his current position in 2022.

DAVID KUCH is senior director development and drug regulatory affairs at Hermes Pharma. With a PhD in chemistry, he built a career in APIs before joining Hermes Pharma in 2015. He oversees the drug regulatory affairs team, which focuses on finished drug products, medical devices and food supplements, and leads the development team, driving innovation in new product concepts and technologies.

For more information, visit hermes-pharma.com.