Ind. J. Pharm. Edu. Res., 2024; 58(4):1045-1053.
https://www.ijper.org

Review Article

Standards of Child Resistant Packaging: A Regulatory View

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ABSTRACT

Aim: Special packaging known as "child-resistant packaging" is intended to minimize the possibility of kids eating harmful substances. The Poison Prevention Packaging Act of 1970 confers jurisdiction to regulate this on the U.S. Consumer Product Safety Commission and amended in 1995 to include senior-friendly packaging which became effective in 1972. **Materials and Methods:** For the protection of children, regulations apply to prescription pharmaceuticals, over-the-counter medicines, insecticides, home chemicals, and unit packaging, such as blister packets. The elderly and those with disabilities have a challenge with child-resistant packaging. Regulations require package and performance tests to be child-resistant and senior-friendly. Certain standards for special packaging like ISO 8317 Requirements and testing procedures for re-closable packages, EN 862 (2005), EN 14375 (2003), ISO 13127 Mechanical test methods for re-closable child-resistant packaging, ASTM D3475 Standard Classification for Child-Resistant Packages (CRPs). Use of CRP Indices such as Package Type (e.g., Aerosol over cap), ASTM Type (e.g., re-closable packaging-continuous thread closure). CRP Manufacturer, CRP Name, Regulations in countries (Canada, The Netherlands, United States, United Kingdom). A few myths concerning packaging for children. **Results and Conclusion:** Reckitt Benckiser is requesting the FDA to require not only child-resistant, unit-dosed containers but also to provide educational programs aimed at lowering the likelihood that children would be exposed to the opioid dependency treatment medicine buprenorphine.

Keywords: Child-resistant packaging, Performance tests, CRP indices, Re-closable child-resistant package, Opioid dependency treatment.

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Received: 21-04-2023;
Revised: 28-07-2023;
Accepted: 22-08-2024.

INTRODUCTION

The Poison Prevention Packaging Act (PPPA) was passed by the 91st Congress of the United States in 1970. The PPPA's principal purpose is to protect children by preventing accidental consumption of hazardous substances.[1] According to the Poison Prevention Packaging Act (PPPA), "The term 'special packaging' means packaging designed or manufactured to make it extremely difficult for a child under the age of five to open it in a reasonable time or to receive a substance is toxic or harmful quantities. To do this, under normal circumstances, is not difficult. Still, proper use by adults is not enough to prevent all of these children from opening or receiving harmful or toxic amounts in a reasonable amount of time.[2] Child-resistant closures for containers were developed in 1967 by Dr. Invented Henri Breaux. Accidents involving children opening domestic packaging and consuming its contents led the United States Congress to approve the 1970 Non-Toxic Packaging Act, which Senator Frank E. Moss of Utah proposed. This allows the Consumer Product Safety Commission to be the body that regulates this area. Decades of changes have expanded the original scope to involve other dangerous substances, along with chemicals coordinated by the Environmental Protection Agency. There is an alteration to correct global standards of demands and protocols. Child-Resistant (C-R) packages can pose problems for the elderly and persons with disabilities. Regulations demand that designs be evaluated to ensure that the majority of people can reach the package. Some jurisdictions permit a pharmacist to prescribe drugs in her non-C-R package if the child does not live in the same home.[2]

It is critical to ensure children's safety, especially when preventing accidental consumption or handling of potentially dangerous chemicals. Child-resistant packaging is an important option for reducing the danger of young children exposing harmful content. Child-resistant packaging occurs in two major types: reclosable and non-reclosable packs. They are designed for challenging youngsters less than 52 months while being available to adults up to 70 years old.

Reclosable packs, by the international standard BS EN ISO 8317:2004 (British Standard European Norm), enable secure resealing upon opening and frequent use without affecting

DOI: 10.5530/ijper.58.4.116

child resistance. Non-reclosable packs, according to European standard BS EN 14375:2003, on the contrary, are meant to be child-resistant after being opened and commonly contain blister and strip packs for medications and single-use household items.[3]

Product requirements for C-R packaging

16 CFR 1700 is a regulation that implements the Poison Prevention Packaging Act (PPPA). The PPPA mandates that some chemicals be packaged in special packaging that is intended or manufactured to be notably difficult for children under the age of five to open in a reasonable amount of time while not being difficult for adults to use correctly. The 16 CFR §1700.14 for a total list of substances requiring C-R packaging:[4]

Paracetamol,

Diphenhydramine,

Aspirin,

Ibuprofen,

Medications and dietary supplements containing iron,

Imidazoline,

Naproxen,

Methyl salicylate,

Mouthwash.

MATERIALS AND METHODS

Qualifications for C-R packaging

Packaging specifications

Each exemption application must include the successive information for all forms of product for which exemption is requested;

Characterization of the packaging presently in use, along with the package manufacturer's name and package specifications;

Characterization of the entire packaging, along with the container or packaging in which the product is supplied to the consumer;

Characterization of all sizes the product is offered in (including physical appearance, color, and flavor); and

A blank sample of a specific type and packaging capacity is required for an exemption and, for pharmaceutical products, an identification of the packaging intended for the supply of the product to domestic consumers.[5]

Evaluation of products for children-resistant

A panel of 50 children (ages 42-51 months) is separated into 3 age brackets (42-44 months, 45-48 months, 49-51 months) and then tested in turn. The duration of the test is 10 min and the child must open the package and use the tooth. The parameters applicable to passing the C-R test can be found in 16 CFR § 1700.20(a)(2)(iii). If the test results are ambiguous, additional tests are needed in one or more of her groups of 50 children each. Up to 200 children can be tested.[2]

Standardized Child Test Instructions

Resealable packaging, when gathered by a laboratory, must be properly fixed for at least 72 hr before opening, as stated in Guideline 3, to allow materials (e.g., sealing film) to "solidifies" will be possible. The enforced torque is documented in the test report.[6]

All packaging must be managed so that no contamination or impact occurs along storage or transportation. Do not expose packages to extreme heat or cold conditions. Packages should be reliable at room temperature.

Reclosable packaging must be unlocked by her once (multiple times if necessary) by the test site or another adult and properly resealed before testing. Do not open and close in front of kids. (In the grown-up re-sealing test, the tester does not have to open and re-seal the package before testing) When using multiple opens/reseals, each of the four testers must quarter unsealed and properly resealed. Open and close each package a second, third, fourth, or tenth time (or describe the number of times) in the same order as the first opening and closing. Do not open or close the package before testing. Each inspector's name and package number that the inspector opens and re-secures must be recorded and reported. Testers don't need to log packages that are opened and saved again.

No obvious physical or mental disability. Children with permanent or temporary illnesses, injuries, or disabilities that prevent effective participation will not be allowed to participate in the test.

The test is conducted in an illuminated area usually for the children, away from interruptions.

The tester or another adult brings both children to the test area. The examiner should position the two children extremely that there is no visible barrier between the child and the examiner.

The examiner speaks to the children to reassure them.

Children should not be given the impression that they are participating in a race or competition.

The tester should record the data before and afterward the test so that the child can pay full consideration during the test.

Testers should use one or more stopwatches or other timers to measure the statistic of seconds the child needs to open the container and measure the duration of the 5-minute test.

At the beginning of the test, the tester must give the children the same package and say, “PLEASE TRY TO OPEN THIS FOR ME”.

If the child ignores to engage after the trial is started, the tester should encourage the child and gently stimulate the child to try. If the child extends to refuse, the tester asks the child to place the packet on their lap until the other child completes it. Children in this pair are not excluded from the results as long as the refusing child does not interfere with other children's participation.

Every child is given a maximum of 5 min to unwrap the package. Testers must supervise children at all times during testing. Testers should minimize conversation with children while they are trying to open the package. Testers should not bother children verbally or visually. If the child becomes discouraged or disinterested and stops opening the package, the examiner should continue to assure the child and should encourage the child (e.g., "Try opening the package").

Provided that the examiner can observe both children, the children must have the freedom to move around and interact with the wrapper in various ways, such as standing up, falling to the floor, or hitting and prying it.

If a child endangers them or others, the test will be canceled and the child pair will be excluded from the final results.

Children can talk about opening packages and watch each other open packages.

One child should not attempt to open another child's package.

Upon the child opening the package, the tester expresses gratitude by saying "thank you" and proceeds to take the package away from the child, placing it out of their reach. It is advised that you refrain from requesting your child to open the package again.

At the end of the 5 min, if one of the children's girlfriends has not opened the package, the tester must demonstrate how to open the package. For demonstrations, you should use a separate "demo" package.

Before the demonstration begins, the tester asks the children to set the package aside. Children are not allowed to attempt to open packages during performance time.

Ask the examiner to say “WATCH ME OPEN MY PACKAGE”.[6,7]

Considerations of CPSC taken into account while determining the need for C-R packaging

Under PPPA, the Consumer Product Safety Commission (CPSC) should deal with the following aspects:

Relevance of standards.

Scientific, medical, and technical data related to special packaging, and instances of child ingestion leading to sickness and harm caused by domestic chemicals.

Manufacturing methods in industries are damaged by PPPA; and

As well as the characteristics and uses of common substances. [8]

Use of Child Resistant Packages Indices

Use the index below to access CRP descriptions and photos. The following three metrics are linked:

The information is indexed based on,

ASTM Type (using the ASTM Classification Standard D3475-09), CRP Name, and CRP Manufacturer.

The information is alphabetically indexed by CRP Manufacturer, CRP Name, and ASTM Type.

The information is indexed by Packaging Type and ASTM Type, and arranged by CRP Name and CRP Manufacturer.

This is not a broad list of all available CRPs or all CRPs that can be used in PPPA-regulated products. CPSC personnel have not approved or validated the manufacturer's test results on child tolerance or efficacy for use by older adults. The CPSC does not endorse, approve, or support any specific CRP, nor does the utilization of any particular container or material, or any particular closure by any listed company that manufactures, develops, and/or tests CRPs. does not approve either. It is the packer's responsibility to choose a CRP that's prudent for the fabric to be packaged and its anticipated utilization.[9]

Environmental Protection Agency (EPA) demands CRP in unit dosage packaging

The Consumer Product Safety Commission (CPSC) packaging requirements and testing processes are referenced in 16 CFR 1700.15(b) and 1700.20 of the EPA's CRP rules. Pesticide product makers, producers, formulators, and registrants must verify that their unit dose packaging fulfills the EPA's CRP criteria to safeguard children from unintentional poisonings.[10]

CRPs are typically either outer retail packaging or particular unit packaging. However, pre-filled, non-refillable pesticide bait stations that are not planned or planned to be opened or operated in an aspect that exposes the capacity to human connection should be in CRP, not outer packaging (PR 97-9: electronic submission of Child-Resistant Packaging (CRP) test data for all pesticides).[11]

Several legal regulations govern the international use of child-resistant packages. The text below briefly describes the most important criteria for child-safe packaging.

ISO 8317 (2003)

The worldwide standard for re-closable child-resistant packaging is ISO 8317 (2003), which also applies to pharmaceutical and chemical items. ISO 8317 (2003) is similar to DIN EN ISO 8317 (2004).[12]

Two tests are required to meet this standard: one with a group of up to 200 babies between the ages of 42 and 51 months who shouldn't be able to open the package, and the other with a group of individuals between the ages of 50 and 70 who should be able

to do so without difficulty. Only packaging that succeeds in both tests complies with ISO 8317 (2003) specifications.

Tests for infants aged between 42 to 51 months

During the testing procedure, children are allowed 5 min to try to open the packaging using any method they can think of. If they are unsuccessful, they are then given an unaccompanied demonstration on how to open the packing. After that, the kids get an additional 5 min to try opening the package once more.

It is considered childproof if not more than fifteen percent of children are successful in opening the box within the initial 5 min. During the 10-minute test, no more than 20% of children should be able to open the box.

Tests for senior citizens aged between 50 to 70

In the senior test, a team of 100 people between the ages of 50 and 70 must open the package within an initial 5 min without demonstration. On the second try, it takes him a minute to open. A package is considered elderly-friendly and convenient if at least 90% of the group can open and close the package properly.

A test group of 100 people between the ages of 50 and 70 should be structured as follows:

25 aged 50-54,

25 aged 55-59,

50 aged 60-70,

In each group, 70% of participants must be female.[13,14]

Important: ISO 8317 (1989) or EN 28317 (1994) certifications and test reports are invalid and need to be updated.[15]

EN 862 (2005)

The worldwide standard for non-reclosable child-resistant packaging for non-pharmaceutical products is EN 862 (2005), which is similar to DIN EN 862 (2006).

This standard covers different types of packaging, including unit doses, refill packs, re-sealable bags, flow packs, and blister packs. Non-reclosable means that the packaging cannot be resealed after the initial opening. Children between the ages of 42 and 51 months are tested by having them try to open the package in 5 or 10 min, with optional tests involving senior citizens aged 50 to 70.

Important: It is essential to remember that earlier certifications or test reports based on EN 862 (2001) must be updated because they are no longer valid.[16]

EN 14375 (2003)

EN 14375 (2003) is the European standard for child-resistant packaging for medicinal items that are not reclosable, which is the equivalent of DIN EN 14375 (2004). DIN 55559, which was previously used, is now no longer valid.

Particularly significant for blister packets, stick packs, and granule sacks is EN 862 (2005). Similar to ISO 8317 (2003), the testing process entails showing that adults 50 to 70 years of age can open the package and proving that adults 42 to 51 months of age cannot.

One significant distinction between the testing procedures and ISO 8317 (2003) is that the standard only considers a packing to be "opened" during newborn tests if the child may take in a maximum of 8 units from the container. (e.g., blister pack).

At least ten dosage units must be easily accessible to the children during the test, thus it is risky and may result in serious incidents to assume that a stick pack or blister holding fewer than eight units does not require child-resistant packaging. The definition of "opened" (number of units removed) varies depending on the degree of danger posed by the active ingredient, according to US requirements (US 16 CFR § 1700.20). This raises questions about the effectiveness and reliability of EN 14375 (2003) when compared to US standards.[17]

Regulation by country

Canada

There is a middle category of medication that does not require a prescription but must still be stored in storage space, behind the bar, or on a shelf that can be easily seen by a pharmacist. This category includes certain muscle relaxants, antihistamines, and some mild codeine medications. If the packaging is deemed child-resistant in Canada, it must meet the CSA 276 C: Drugs I requirement. This standard contains several laws, including the PPPA, UK Standard BS 5321, and CSA 276 (1992 edition) for re-closable packages (1995) and non-reclosable packages.[18]

The Netherlands:

There are four subcategories of drugs in the Netherlands:

UR (prescription-only),

UA (pharmacist-only),

UAD (pharmacist or drugstore-only), and

AV (general sale).

UA drugs can be sold over-the-counter, but only by pharmacists, and are displayed on shelves like other products. Examples include dextromethorphan, 400 mg of ibuprofen, and domperidone. Drugstores, which do not take prescriptions and only sell a small selection of popular medications, as well as other items like toys, devices, fragrances, and homeopathic goods, can also sell UAD medications. These drugs have low risk and dependency potential and are usually displayed on shelves. Examples include naproxen, cinnarizine, diclofenac in small amounts, 500mg paracetamol up to 50 tablets, and 400 mg ibuprofen up to 20 tablets. AV medications include those with little danger to the general

population, such as cetirizine, paracetamol up to 20 tablets, 200 mg ibuprofen up to 10 tablets, and loperamide. These medications may be purchased from grocery stores, petrol stations, and other places.[19]

United States

The Poison Prevention Packaging Act (PPPA), which went into force in 1972, gives the U.S. Consumer Product Safety Commission (CPSC) the ability to regulate CRP packaging. The PPPA determines "special packaging" as packaging which is designed or established to make it extremely difficult for children under the age of five to open it or get a toxic or harmful quantity of the substance included therein within a reasonable time while being simple for normal adults to use correctly.[20]

The CPSC administers the PPPA and sets CRP for several hazardous household items. The CPSC's regulations specify "special packaging standards" (commonly known as child-resistant packaging, or CRP) for a variety of items. The ASTM categories are taken from D3475-09, Standard with permission. 40 CFR 157 subpart B contains the EPA's pesticide rules for Child-Resistant Packaging (CRP).[21-23]

United Kingdom

The UK's Medicines Act of 1968 governs the three different categories of medicine.

Prescription Only Medicines (POM). It can only be obtained lawfully with a legitimate prescription from a prescribing physician. Pharmacists must be on-site to dispense POM medications as required by law. This drug has been formulated specifically for patients with a prescription and is therefore considered safe for use by the recipient alone. Just one example of this is most antibiotics and all antidepressants or antidiabetics. Strong painkillers like hydrocodone and tramadol, sildenafil (Viagra), and diazepam (Valium) medications, as well as some cosmetic formulations like corticosteroids, are all included in the list of POMs. Drug traffickers frequently sell these substances. Particularly those classified as "CD POM" are under supervision because of the possibility of misuse, including methadone, temazepam, and B. diaconal.

The General Sales List (GSL) comprises safe medicines that can be sold without the need for pharmacy training, and are available in supermarkets and other stores. These medicines are generally safe for most people and include creams in small pack sizes among other things.

Pharmacy Medicines (P) are a category of medicines that do not fall under the Prescription Only Medicines (POM) or General Sales List (GSL) categories. They can only be sold by registered pharmacies and are not available for self-selection. The GSL list does not include "P" medicines because they might need to be advised on the use or referred to a doctor. Under the direction of a pharmacist, trained assistants can offer these medications and will enquire as to whether the client needs to speak with a pharmacist.

It is inappropriate to offer a "P" drug if self-management is not possible and a recommendation to a physician is necessary. The pharmacy has a legal and ethical obligation to send the client to an acceptable facility. Therefore, a sale should not take place in such cases.[24]

Europe

EN 14375, which is a standard in Europe, has been in force since late 2003. Denmark, Finland, Belgium, Germany, Ireland, France, Italy, Greece, Iceland, Malta, Luxembourg, Austria, The Netherlands, Norway, Portugal, Sweden, Spain, Switzerland, Slovakia, Hungary, Czech Republic, and the UK were among the CEN (Comité Européen de Normalization, Geneva) members who approved it. To be put into practice, each member state must transform this European norm into a national one. EN 14375 is recognized as a DIN in Germany.[25]

Germany

The German Medicines Law, known as the Arzneimittelgesetz, requires certain products to be packaged in child-resistant containers. Specifically, as per the regulation in § 28 of the Arzneimittelgesetz on child-resistant packages for pharmaceuticals, which was published on February 12, 1982, and updated on September 17, 1984, the listed formulations can only be sold in specific containers.

Pharmaceuticals can be packaged in ways that are difficult for children to open, such as sealed strip packages with individual dose packaging that is exclusively opaque or dark-colored, push-through packages (also known as blister packages) with individual dose packaging that is exclusively opaque or dark-colored, or containers with safety closures that combine push and twist mechanisms. Single-dosage envelopes or containers work well for child-resistant packing when it comes to medicines like unit dose powders or granulates.[26]

Australia

Therapeutic Products Order No. 65, which establishes child-resistant packing guidelines for non-reclosable and reclosable therapeutic goods, is in force in Australia under the Therapeutic Goods Act 1989. Specific substance specifications must be fulfilled for non-reclosable products like blisters or single-unit dose packages. The AS 1928-1982 standard defines test methods. According to the procedure from 1996, if a suitable test certificate is given, authorized shipments from the US, Canada, or Australia will also accept the UK.[27]

India

IS 14233 (1995) is an Indian standard that pertains to the packaging of pharmaceutical products and outlines the specifications for child-resistant and tamper-proof packaging of solid dosage forms. This specification, which covers the use of blisters and strip packets, is comparable to BS 7236. A mechanical test is used to evaluate the package rather than evaluating it with children.[28]

Japan

In Japan, no established standards and regulations exist for child-resistant and senior-friendly packaging. Therefore, it is entirely at the discretion of the pharmaceutical company to decide if and how to package their products with child and senior protection measures.[29]

Canada

This situation is covered by the Canadian standard CSA 276 C: Drugs I, which says that a container is deemed child-resistant if it conforms to the CSA 276 re-closable packages (1995), UK Standard BS 5321, and PPPA.[30]

New Zealand

The Department of Health has approved the NZS 5825 standard for both non-reclosable and reclosable containers in New Zealand. Additionally, New Zealand has given its approval to products that have been deemed child-resistant in Europe, the US, or Australia.[31] The list of country-specific guidelines established in the years is summarized in Table 1.

Reckitt Benckiser, a worldwide consumer products business, has been seeking to compete in the marketplace for Suboxone Film, a prescription oral drug intended to reduce symptoms of withdrawal in opiate addiction patients.

Reckitt Benckiser is attempting to compete with its rivals in the market for Suboxone Film. The company recently announced that it will discontinue production of Suboxone tablets due to concerns that they are more prone to accidental ingestion by children, as they contain the opioid buprenorphine. This move eliminates competition from its product line.

The company has requested that the FDA mandate pharmaceutical companies package their buprenorphine medications in child-resistant, separate dosages. This move is advantageous for Reckitt as its Suboxone Film product is already packaged in an individually wrapped format.

"Child-resistant, single-dose Suboxone Film packaging might indicate a few of the primary contributors to the reduction in rates of exposure when relative to Suboxone Tablets, which are provided in a multi-dose bottle containing 30 tablets," the company said in a statement.[32,33]

RESULTS AND DISCUSSION

Child-resistant packaging is designed to make it challenging for children less than 52 months to open or access the contents within a reasonable time frame, while still being easy for adults up to 70 years old to use correctly. Reclosable and non-reclosable packs can both be designed to be child-resistant, using various methods. Reclosable packs, as defined by the international standard BS EN ISO 8317:2004, include: "A package that, once opened, is capable of being reclosed with a comparable degree of protection and of being used an adequate number of times to release the total contents with no loss of security".

Child-resistant packaging can be categorized into two types, re-closable and non-reclosable, and there are various methods employed to achieve child resistance. The common factor among these methods is that they require the child to perform two simultaneous actions, which children under 52 months are unable to do. Among the most widely used child-resistant mechanisms are the push and turn, a two-piece molding that presents a false affordance, and squeezes and turn packs, which are typically single-piece moldings and popular for household products. Another method is 'line up the arrows,' where two fixed points on the container and closure must be aligned for the pack to open. It should be noted that all reclosable child-resistant packs consist of a container and closure, making up the complete pack and that there are no child-resistant closures or containers. The international standard BS EN ISO 8317:2004 defines a reclosable pack.[34] The European standard BS EN 14375:2003 defines a non-reclosable child-resistant pack as a package or part of a package that cannot be properly closed again once all or part of the contents have been removed and is designed to be child-resistant. Non-reclosable packs such as blister and strip packs are commonly used to package medicines and single-use household products. Making opening a two-step process, such as "peel and push," or using a paper label that is difficult for children

Table 1: List of Country-specific guidelines for CRP.[27]

Country	Year
US	1970
Canada	1975
Australia	1985
Italy (only regulation, no standard)	1984
United Kingdom, BS 7236 CoP	1989
The Netherlands follows DIN	1985
EN 14375	2003
UK, BS8404	2003
Germany, DIN 55559	1979
Korea	2007

to remove, and applied to the lidding foil, are typical methods for designing child-resistant non-reclosable packs.

Child-resistant packaging is typically composed of or includes a high amount of plastic. Reclosable packs may contain a glass container, while blister packs commonly use aluminum foil and paper for lidding material; however, plastic, Polypropylene (PP), High-Density Polyethylene (HDPE), Low-Density Polyethylene (LDPE), or Polyvinyl Chloride (PVC) are the major materials used. Hence this type of packaging is important to the plastics industry.[35]

The child test specifies that the pack is tested by a panel of up to 200 children aged 42-51 months that is three-and-a-half to four-and-a-quarter years. Each child is given a pack and asked to open it, after 5 min they watch a silent demonstration and then they try to open the pack for a further 5 min. For the pack to succeed in the test 85% of the panel must fail to open it before the demonstration and 80% must fail to do so after it. Reckitt Benckiser has decided to pay $50 million to resolve antitrust accusations brought by the Federal Trade Commission that it engaged in a fraudulent strategy to stymie lower-cost generic competition for its branded medicine Suboxone. The business reportedly created a patent-protected dissolvable oral film version of Suboxone and attempted to shift prescriptions to that film. Reckitt reportedly used a "product hopping" plan in which the business claimed that the film form of Suboxone was safer than the tablet version since kids were less likely to be introduced to the film product by mistake.[36] If your child ingests a potentially poisonous substance, it is important to take the following steps:

- Call 999 for an ambulance.
- Determine what, when, and how much your child has consumed.
- Preserve a sample of the substance or the container to present to the ambulance crew.[37,38]

Benefits and Acceptance of Child Resistant Packaging

Reference has been made to the contribution of child-resistant packaging to the prevention of child poisoning. This packaging also prevents the many thousands of domestic traumas of suspected poisoning, minor spills, or non-fatal ingestions but worrying. The regulatory structure for the utilization of child-resistant packing is, unremarkably, open to criticism. But the industry, packaging, consumer products, and healthcare have in many cases stepped up and specified packaging over and above what is required by regulation. Non-regulated products like mouthwash are routinely packed in child-resistant packs, and in many cases, blister packs are tested to a higher level of child resistance than that laid down as a minimum in EN 14375.

The benefits of ongoing pack testing are varied. Observations of adults opening the packaging have proved a catalyst in the development of standards of accessible design and the design of easier opening packaging generally. At the other end of the spectrum as new child-resistant packs are developed regard is paid to the most recent testing observations. Quite simply what would resist opening by a 1975 child may cause little trouble to a product of today's hands-on and intelligent teaching. Over the past forty years, child-resistant packaging has proved to be a lifesaver and an agent for preventing less serious but worrying ingestions by children. This is not just recognized by regulatory authorities throughout the world but by bodies such as the United Nations International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO).[34,39]

CONCLUSION

Firstly, it has been suggested that the drafting of Child-Resistant (CR) standards is not scientifically based and that more emphasis should be placed on mechanical test methods. While CR standards are designed to protect children from accidental ingestion of harmful substances, some argue that current standards may not be sufficiently effective in achieving this goal. The certificate of compliance for CR packaging is currently based on a one-off test, which some argue is not adequate to ensure ongoing compliance. To address this issue, it has been proposed that a European monitoring system be implemented to provide ongoing oversight of compliance with CR packaging standards. While protecting children from accidental ingestion is undoubtedly an important goal, it is also important to ensure that the elderly and infirm can access medicinal products when they need them. Finally, several myths surrounding CR packaging persist despite evidence to the contrary. For example, some individuals believe that CR packaging is designed such that children cannot open it, but adults can. However, this is not entirely true, as some adults may struggle with CR packaging. Nevertheless, rigorous testing ensures that packaging is effective at preventing children in the "danger age group" from accessing its contents. In reality, child-resistant packaging represents one of the best recorded prevails in avoiding child poisoning in developed nations, according to the World Health Organization (WHO) and UNICEF's 2008 Global Report about child harm prevention. Additionally, the report also highlighted that non-child-resistant blister packs for medicines, which are common in many EU countries, pose a real hazard to children. Despite this, some continue to argue that child-resistant packaging is unnecessary, citing personal anecdotes as evidence. However, it is important to remember that children are much more vulnerable to the effects of ingesting harmful substances than adults, and what may not harm an adult could be extremely dangerous to a child. Therefore, it is crucial that child-resistant packaging continues to be used to protect young children from accidental poisoning.

ACKNOWLEDGEMENT

The authors gratefully thank the assistance of JSS College of Pharmacy, Mysuru, and JSS Academy of Higher Education and Research, Mysore in completing this manuscript.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CRP: Child-resistant packaging; **ISO:** International Organization for Standardization; **ASTM:** American Society for Testing and Materials; **PPPA:** Poison Prevention Packaging Act; **CPSC:** Consumer Product Safety Commission; **EPA:** Environmental Protection Agency; **OTC:** Over-the-counter; **CARES:** Corona virus Aid, Relief, and Economic Security; **GSL:** General sale list; **POM:** Pharmacy, prescription-only; **CEN:** European Committee for Standardization; **CSA:** Canadian Standards Association; **BS EN:** British Standard European Normal; **PP:** Polypropylene; **HDPE:** High-density polyethylene.

SUMMARY

Child-resistant packaging usually has a lot of plastic in it, and some reclosable packs could include glass containers in them. Paper and aluminum foil are frequently used for blister pack lidding. Child-resistant packaging is crucial to the plastics industry since plastic polymers including polypropylene, high-density polyethylene, low-density polyethylene, and polyvinyl chloride are important constituents.

Medicines and single-use household items are packaged in non-reclosable child-resistant packets, which are defined by European standards as those that cannot be correctly closed after opening. Two-step procedures such as "peel and push" or the use of a child-resistant paper label on the lidding foil are techniques for creating non-reclosable packets.

Children between the ages of 42- and 51-months test child-resistant packets. If 85% of the pack fails to open it before a demonstration and 80% fails after the presentation, the pack has to pass.

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Cite this article: Ravindra GK, Subramaniam B, Veeranna B. Standards of Child Resistant Packaging: A Regulatory View. Indian J of Pharmaceutical Education and Research. 2024;58(4):1045-53.