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GRAPHIC DESIGN AND PACKAGING
PROPOSAL FOR THE CODING OF PHARMACEUTICAL PACKAGING

Ángela Aguilera Baena[*]

Abstract. This project aims to design a proposal for graphic coding applied to pharmaceutical pack aging, with the purpose of creating a system that can be implemented by pharmaceutical production companies and that establishes guidelines to make packaging more intuitive, legible, accessible, and adapted to the needs of the end users older adults. It is a project that explores design in the pharmaceutical industry, gerontodesign, and the needs of this population group. This undergraduate thesis seeks to provide a solution to a current social issue: the difficulties faced by older adults in identifying medications due to poorly accessible packaging design. Through research and graphic design, a labeling proposal will be developed to facilitate this process. In the first part of the project, the objectives are defined, and the topic is contextualized. Here, the need for a project of these characteristics and the role of graphic design within it are justified. The target audience is studied through gerontodesign, focusing on their needs and the most common conditions associated with aging. In addition, research is conducted on the current regulations published in the Official State Gazette (BOE). The development phase then follows, where the proposed code is detailed, and a prototype is generated as a model. The evolution of the project is reflected in the graphic conclusions drawn from the research and their application to the redesign of the packaging of an existing pharmaceutical brand. Prototypes are created to present the final results in a practical and visual way.

Keywords: Graphic design; pharmaceutical packaging; visual coding; gerontodesign regulation; accessibility; user-centered design.

Resumen. Este trabajo tiene como objetivo diseñar una propuesta de codificación gráfica aplicada al packaging farmacéutico, con el fin de crear un sistema que pueda ser implementado por las compañías farmacéuticas y que establezca pautas para que el packaging sea más intuitivo, legible, accesible y adaptado a las necesidades de las personas mayores usuarias. Se trata de un proyecto que explora el diseño en la industria farmacéutica, el gerontodiseño y las necesidades de este grupo poblacional. Esta tesis de grado busca dar solución a un problema social actual: las dificultades que enfrentan las personas mayores para identificar medicamentos debido a la dificultad de acceso al diseño de packaging. A través de la investigación y el diseño gráfico, se desarrollará una propuesta de etiquetado para facilitar este proceso. En la primera parte del proyecto, se definen los objetivos y se contextualiza el tema. Aquí se justifica la necesidad de un proyecto de estas características y el papel del diseño gráfico en él. Se estudia al público objetivo a través del gerontodiseño, centrándose en sus necesidades y las afecciones más comunes asociadas al envejecimiento. Además, se investiga la normativa vigente publicada en el Boletín Oficial del Estado (BOE). A continuación, sigue la fase de desarrollo, donde se detalla el código propuesto y se genera un prototipo como modelo. La evolución del proyecto se refleja en las conclusiones gráficas extraídas de la investigación y su aplicación al rediseño del envase de una marca farmacéutica existente. Se crean prototipos para presentar los resultados finales de forma práctica y visual.

Palabras clave: Diseño gráfico; packaging farmacéutico; codificación visual; regulación gerontodiseño; accesibilidad; diseño centrado en el usuario.

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1. INTRODUCTION. OBJECTIVES

Graphic design plays a fundamental role when it comes to communicating specific information, especially in sectors where clear and quick understanding is essential. One of these sectors is the pharmaceutical industry, where packaging, in addition to protecting and transporting the medicine, acts as a medium to convey the necessary information to patients.

The pharmaceutical industry, due to its direct connection with public health, is one of the most demanding industries in terms of the quality of its production, packaging, transportation, and distribution processes of the final product. However, the current design of these packages presents a series of drawbacks that directly affect usability, particularly for older adults. This segment of society is the most affected by these issues, since aging often involves a decline in basic abilities such as vision, information comprehension, or memory. The legal framework that regulates the content and requirements of packaging material is established in Royal Decree 1345/2007, of October 11, which regulates the authorization procedure, registration, and conditions of dispensing of industrially manufactured medicinal products for human use.

One of the fundamental aspects of any medication is its identification and information, which must accompany it as a guarantee of its proper use, promoting safety and efficacy in its application (BOE, 2007). The information of a medicine is made up of the following elements: the technical sheet or summary of product characteristics and the packaging material. According to the consulted source, this constitutes one of the essential elements of drug information, as it must guarantee the unambiguous identification of the medicine as well as provide the necessary information for its correct administration and use.

Figure 1
Summary table of mandatory content required on packaging.

	Packaging Content	Outer Packaging	Primary Packaging		
			Other than ampoules and blisters	Small boxes	Blisters and strips
1	Name of the medicinal product	YES	YES	YES	YES
2	Name of the medicinal product (Braille)	YES	Absence E.E.	Absence E.E.	Absence E.E.
3	Active substance composition	YES	YES	NO	NO
4	Excipients	YES	YES	NO	NO
5	Pharmaceutical form and content	YES	YES	Content only	NO
6	Method and route of administration	YES	YES	YES	NO
7	Warning: "Keep out of the reach of children"	YES	YES	NO	NO
8	Special warnings	YES	YES	YES	YES
9	Expiry date (month and year)	YES	YES	YES	YES

	Packaging Content	Outer Packaging	Primary Packaging		
			Other than ampoules and blisters	Small boxes	Blisters and strips
10	Special precautions for storage	YES	YES	YES	YES
11	Special precautions for disposal	YES	YES	NO	NO
12	Marketing authorisation holder	Name and adress and, where applicable, the name of the local representative	Name and adress and, where applicable, the name of the local representative	Only name	Only name
13	National code	YES	YES	NO	NO
14	Batch number	YES	YES	YES	YES
15	Indication of use (non-prescription medicines)	YES	YES	NO	NO
16	Prescription and dispensing conditions	YES	NO	NO	NO
17	Blank box for posology	YES	NO	NO	NO
18	Transport of radionuclides	YES	YES	NO	NO
19	Technical specifications for medical gases	YES	YES	NO	NO
20	Symbols, abbreviations, and legends	YES	Only symbols	Medicinal products containing radionuclides: international symbol of radioactivity	NO
21	Tamper-proof coupon - National Health System	YES	NO	NO	NO

Note. BOE, 2007.

Aging is a biological process that leads to the deterioration of cognitive and sensory abilities, making it difficult to understand and follow certain processes in daily life. Older adults currently make up 20% of the Spanish population, and predictions indicate that by 2033 this figure will exceed 25% (INE, 2023). They are also the population group most affected in the process of taking medication. As the cited source indicates, polypharmacy is frequent in this sector, which makes it necessary to develop a visual coding system to facilitate this process. Gerontodesign, as part of universal design, focuses on addressing all the needs of older adults. Its purpose is to transform existing products and designs to provide a better quality of life, as well as to create new ones that adapt to their needs (Rivero, M. 2017).

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Figure 2
Most common pathologies and medications in older adults.

Disease	Affects	Medication (Family and compound)
COPD, Enphysema, Bronchitis, Pneumonia	Chronic obstructive pulmonary diseases, lung impairment, difficulty breathing.	Bronchodilators (salbutamol – Ventolin) NSAIDs (paracetamol, ibuprofen) Antibiotics (amoxicillin, azithromycin)
Heart failure	Heart diseases, inability of the heart to pump blood properly.	Positive inotropes (digoxin) Sympathomimetics (dopamine) Vasodilators (nitroglycerin) Diuretics (chlorothiazides) ACE inhibitors (captopril) ARBs (valsartan, losartan)
Arterial hypertension (high blood pressure)	Artery disease, blood pressure in vessels too high.	ACE inhibitors (captopril) ARBs (valsartan, losartan) Aldosterone antagonists (eplerenone, finerenone) Beta-blockers (propranolol, atenolol)
Arthritis	Inflammation of the joints, leading to loss of mobility and possible deformity.	NSAIDs (paracetamol, ibuprofen) Glucocorticoids (cortisone) Monoclonal antibodies (rituximab)
Osteoarthritis	Unlike arthritis, which is more severe and autoimmune, osteoarthritis is caused by joint wear and tear.	NSAIDs (paracetamol, ibuprofen) Glucocorticoids (cortisone)
CVD - Type 2 Diabetes	Affects how the body uses sugar (glucose) for energy, preventing proper insulin use.	Insulin Insulin secretagogues (chlorpropamide, semaglutide) Insulin resistance inhibitors (metformin)
CVD - Obesity, cholesterol	Cardiovascular diseases.	Atorvastatin (Lipitor) Fluvastatin (Lescol XL)
Cystitis	Acute inflammation of the urinary bladder, with or without infection.	Antibiotics (fosfomycin, trimethoprim)
Depression	A psychiatric and psychological diagnosis describing a mood disorder.	Tricyclic antidepressants (imipramine, amitriptyline)
Dementia, Alzheimer's disease	Dementia refers to mental health decline in general, while Alzheimer's disease is a specific brain disorder.	IAcetylcholinesterase inhibitors (rivastigmine)
Parkinson's disease	A brain disorder causing movement, mental, sleep, pain and other health problems.	Dopaminergic drugs (levodopa, carbidopa, amantadine)

Note. By Gómez I., 2018

In graphic design, psychology plays a fundamental role since the goal is to create impact, communicate a message, and ensure it is correctly perceived by the user. The Gestalt laws are a set of fundamental principles in the psychology of perception that explain how the human brain organizes and interprets visual information (Reyes, M., 2016). Pharmaceutical packaging must be highly regulated to ensure patient safety and guarantee the effectiveness of the medicine, among many other factors. When creating a code or regulation for pharmaceutical packaging, the first and most important aspect to consider is the legibility and comprehension of the information. Furthermore, color can act as a powerful psychological tool, influencing perception, memory, and even user behavior. Color goes beyond aesthetics; it helps convey meaning (Brandsymbol, 2025). The well-known Borggrafe table is a chromatic classification system based on the legibility of color in typography. It is founded on the relationship between tones, shades, and brightness to generate visually balanced and functional combinations (Mancini, L., 2024), and it is essential to consider it when developing an effective code. On the other hand, icons are also among the most relevant aspects when creating an effective code. They are especially effective when placed at points where the user must make quick decisions or when it is necessary to reinforce the understanding of specific content (Harley, A., 2024).

Figure 3
Karl Borggrafe's color figure.

Tabela de Karl Borggrafe
(in Favre & November, 1979:48)

Note. 2019.

Figure 4
Use of the color in industry.

Color in industry		
1	Blue	Trust, calm, clinical clarity
2	Green	Healing, cleansing, nature
3	Red	Blood, urgency, strength, warning
4	Yellow	Optimism, movement, energy
5	Purple	Innovation, rarity, neurology
6	Gray/ Black	Sophistication, neutrality, authority

Note. By Reich S., 2013

1.1 OBJECTIVES
General objective:
- Create a system that can be implemented by pharmaceutical laboratories to establish guidelines that make packaging more intuitive, legible, and accessible.

Secondary objectives:
- Research the current regulations and review the existing issues to analyze areas for improvement.
- Design packaging that solves the stated problem by applying the proposed system.
- Develop an appropriate color palette to help easily differentiate treatment lines.
- Create an icon system that reinforces user understanding. - Select the most legible and suitable typefaces.
- Redesign inadequate packaging from current pharmaceutical brands.

2. METHODOLOGY
First, an in-depth investigation will be carried out on the essential aspects to be considered in this project. Current regulations and legislation in Spain will be analyzed, consulting the most recent and relevant articles published in the Official State Gazette (BOE).

Subsequently, the target audience will be studied, focusing on older adults, their main characteristics as a social group, and the

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threats and weaknesses they face in their daily activities. This analysis will be based on the study of gerontodesign by Maya Rivero (2015) , as well as on the principles of accessible and functional design for this group. In addition, the main pathologies and diseases affecting older people will be researched, using data from the National Institute of Statistics and related official studies.

In parallel, an analysis of the discipline of packaging will be conducted through specialized sources such as The package design book (Wiedemann, 2017). Furthermore, colors, sizes, hierarchies, and other essential graphic design elements will be studied through books such as Diseño Gráfico. Nuevos fundamentos(Lupton, J. & Cole, P., 2016) and Diseñar con y sin retícula (Gálvez, F., 2004). After this, prototypes will be developed with the aim of evaluating key aspects such as legibility, contrast, and information hierarchy. Based on this evaluation, an existing pharmaceutical packaging design will be redesigned, applying the proposed graphic system while complying with the requirements established in the regulations.

2.1 CODING SYSTEM
After studying and making the appropriate decisions regarding each of the essential elements in pack aging design, a table is created that compiles all the information and will serve as a code to be applied to the design.

Figure 5
Code table.

Final Coding Proposal		
Aspects	**Decisions**	**Improvements**
Tipography	**Sizes.** Minimum of 9pt; maximum flexible depending on design and available space. **Typeface.** Sans-serif, geometric/humanist, x-height ≥ 1.4 mm, family with a variety of weights, neutral design. Ensures legibility and comprehension, reduces visual fatigue, especially for older adults. **A brief explanation** of what the medication is and what it is intended for allows users to understand its function and purpose. This information is essential to ensure proper administration, minimize the risk of confusion, and promote responsible and safe use.	Ensures legibility and comprehension, reduces visual fatigue, especially for older adults.
Color	**Associated Color Palettes.** Red – Circulatory system Blue – Respiratory system Dark Blue – Mental disorders Yellow/Orange – Musculoskeletal system Violet – Endocrine system Green – Urinary system	Generates an immediate emotional response, facilitates distinction between treatment lines, conveys meaning before reading the text.

Final Coding Proposal		
Aspects	**Decisions**	**Improvements**
Iconography	**Icon System.** Representing each of the pathology groups. Placed at points of quick decision-making. Outlined, simplified without excessive detail or abstraction. Heart – Circulatory system Lungs – Respiratory system Brain – Mental disorders Bone – Musculoskeletal system Thyroid gland – Endocrine system Kidneys – Urinary system **Pharmicons.** Integration of a standardized pictogram project designed to convey dosage, instructions and warnings.	Improves speed of comprehension and visual clarity; facilitates interpretation of instructions and prevents confusion. Strengthens universal understanding of information, minimizes errors and enhances safety.

3. RESULTS
The mock-ups presented below constitute the practical proposal of the coding system developed in this project. They coherently and systematically apply the entire proposed coding framework, adapting it to different pharmaceutical packaging formats to demonstrate its versatility and real-world applicability. These proposals aim to establish a reference model that facilitates the implementation of the coding system within the pharmaceutical sector.

The mock-ups should not be understood as fixed designs, but rather as a flexible guide or matrix that can be adapted by different laboratories according to their specific needs and brand characteristics, always respecting the established foundations. The proposed graphics combine functionality, accessibility, and design, contributing to an improved end-user experience and promoting clearer communication in pharmaceutical packaging.

Figure 6
Results. General models.

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Redesign to demonstrate the effectiveness and applicability of the coding system, Aristo Pharmaceuticals has been selected as a case study. This choice is not arbitrary, as the current packaging of Aristo Pharma Iberia presents several shortcomings that hinder the correct identification and use of medications. Among the main issues identified are the disorganized arrangement of information, the use of fonts with small sizes, and the application of overly similar colors for completely different drugs, which can cause confusion for the user. Furthermore, the laboratory has been involved in controversy due to the design of its packaging, precisely because of the lack of clarity and accessibility. These errors highlight the

need for a review of its system and a redesign of its packaging. The redesign proposal applies the guidelines established in the developed coding system. The result is a packaging solution that is much clearer, more accessible, and more modern, organizing information hierarchically, improving legibility, and using a coherent and distinctive color system to prevent errors in identification. Thus, the redesign not only provides a more suitable aesthetic solution but also optimizes the user experience and ensures effective and safe visual communication within the pharmaceutical field.

3.1 CURRENT DESIGN AND REDESIGN MOCKUP

Figure 7
Original packaging of Aristo Pioglitazone, Type 2 Diabetes treatment. Endocrine system.

Figure 8
Proposal of redesign and details.

Figure 9
Proposal of redesign and details.

4. CONCLUSIONS

Regarding the objectives set at the beginning, it can be stated that the main objective—to create a system that can be implemented by pharmaceutical companies and establish guidelines to make packaging and leaflets more intuitive, legible, and accessible has been achieved. A regulation based on color, typography, and graphic hierarchy has been designed, which is adaptable to different medications and aligns with the current system used in the pharmaceutical industry.

Concerning the secondary objectives: The objective related to designing packaging that

addresses the identified problems by applying the created system has also been fulfilled. A graphic proposal has been developed as a guide for implementing the code, and by following it, the packaging of Aristo Pharma has been redesigned, applying the proposed system to achieve clearer packaging. Up to four typefaces, several optimal color palettes, and a comprehensive icon system have been selected, which together form the graphic foundation of the proposal.

The development of this project has involved a complex process requiring continuous analysis and re search. The choice of topic

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represented a challenge due to the complexity of the applicable regulations and the need to address technical, visual, and social aspects of great relevance simultaneously.

During the process, setbacks were encountered related to obtaining reference packaging, as it was not possible to access original medication mock-ups due to their prescription-only status. This limitation required seeking alternatives through external material, which, rather than being an insurmountable obstacle, enriched the project by enhancing problem-solving skills. Likewise, the development of this work was constrained by time, which required narrowing the initially proposed objectives. Nevertheless, this study aims to lay the groundwork for future, more extensive research, encouraging further exploration in the field of accessible design applied to pharmaceutical packaging.

It is important to highlight that establishing a coding system universally applicable to all pharmaceutical companies is not straightforward, given the scope of the industry and the diversity of its guidelines. However, this project seeks to serve as a starting point, emphasizing the need to standardize certain criteria to promote understanding and accessibility of packaging.

In this sense, there is a lack of solid proposals addressing this issue from the perspective of graphic design and gerontodesign—fields that are essential for improving the end-user experience. In conclusion, this project aims to address a current issue: the lack of accessibility and usability flaws in medication packaging. Considering the significant role of medication in the daily lives of millions of people, especially older adults, it is essential to ensure effective, clear, and accessible visual communication. In doing so, it contributes not only to improving users' quality of life but also to strengthening safety and efficacy in the use of medications.

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