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Review Article

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REGULATORY REQUIREMENTS AND CURRENT CHALLENGES RELATED TO LABELING AND PACKAGING OF MEDICINAL PRODUCTS IN EU REGION

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Abstract: The Common Technical Document (CTD) format was developed by the International Council for Harmonization (ICH) to harmonize and simplify regulatory submission requirements across different countries. In the European Union (EU), medicinal product labeling includes three major components: the Summary of Product Characteristics (SmPC), Patient Information Leaflet (PIL), and outer or immediate packaging labels, which are included in Module 1 of the CTD. These documents provide essential information to healthcare professionals and patients, ensuring the safe and effective use of medicines. Before marketing a medicinal product in the EU, it must obtain Marketing Authorization (MA) from the relevant regulatory authority. Any changes to approved product information must be submitted through appropriate variation applications and implemented within the timelines specified by EU regulations. In addition to general labeling requirements, EU member states follow country-specific requirements known as Blue Box requirements, which include legal status, national symbols, pictograms, and product identification details. The pharmaceutical industry faces several challenges in maintaining labeling compliance, readability, product identification, and preventing dispensing errors. Other challenges include regulatory variations, supply chain management, and changes arising from Brexit. To prevent counterfeit medicines from entering the legitimate supply chain, the EU introduced the Falsified Medicines Directive (FMD), which strengthens product security and traceability through safety features. Compliance with the EU FMD safety requirements became mandatory for relevant manufacturers and stakeholders from February 2019. Overall, effective packaging and labeling compliance plays an important role in maintaining regulatory standards, ensuring medicine authenticity, and protecting patient safety across the European region.

Keywords: *Common Technical Document (CTD), EU Labeling Compliance, Blue Box Requirements, Falsified Medicines Directive (FMD), Marketing Authorization Variations.*

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INTRODUCTION

The European Union (EU) has established a comprehensive regulatory system to ensure that medicinal products placed on the market meet appropriate standards of quality, safety and efficacy. The European Medicines Agency (EMA) plays a central role in the scientific evaluation, supervision and monitoring of medicines for human and veterinary use. This coordinated regulatory framework supports public health protection and provides a consistent approach to the regulation of medicines across the EU [1,3]. Within this framework, the packaging and labelling of medicinal products are essential elements of medicine safety. They provide the information required by patients, pharmacists and other healthcare professionals to identify a medicine and use it correctly. Clear and accurate labelling helps communicate the product name, strength, pharmaceutical form, route of administration, dosage instructions, warnings, storage conditions, batch number and expiry date. Inadequate, unclear or inconsistent information may contribute to medication errors, incorrect administration and risks to patients. Therefore, product information must be accurate, legible, understandable and consistent with the approved marketing authorisation [10,11,14,20].

The Common Technical Document (CTD), developed by the International Council for Harmonisation (ICH), provides a harmonised structure for regulatory

submissions. It is organised into five modules covering administrative information, summaries, quality data, non-clinical reports and clinical study reports. For EU submissions, Module 1 contains region-specific administrative and product information. The product-information section includes the Summary of Product Characteristics (SmPC), labelling and package leaflet, together with supporting items such as mock-ups and specimens. Thus, Module 1 is particularly relevant to the regulatory assessment of medicinal product labelling and packaging [3,17,20].

The main product-information components in the EU are the Summary of Product Characteristics (SmPC), the Patient Information Leaflet (PIL) and the information displayed on the outer and immediate packaging. The SmPC is the approved professional information document and describes the authorised use of the medicine, including its therapeutic indications, dose and method of administration, contraindications, warnings, interactions, adverse reactions and pharmaceutical particulars. The PIL is intended for patients and explains, in accessible language, what the medicine is used for, what should be known before taking it, how it should be used, possible side effects, storage instructions and other relevant product details. The outer and immediate packaging carry essential identification and safety information needed throughout dispensing, storage and use [7,8,14,20].

Pharmaceutical packaging also performs protective and practical functions. Primary packaging is in direct contact with the medicinal product, such as a blister, strip, vial or bottle. Secondary packaging surrounds the primary pack, commonly as a carton, and provides additional protection and space for product information. Tertiary packaging is used mainly for bulk handling, storage and transportation. Packaging materials should protect the medicine from environmental influences and physical damage, maintain product integrity and be suitable for the intended dosage form [4]. The design and content of the pack must support safe identification and use while remaining consistent with the approved product information [10,18].

Before a medicine is marketed, the applicant or Marketing Authorisation Holder (MAH) must submit the required product information as part of the marketing authorisation procedure. Packaging artwork is assessed through mock-ups and specimens. A mock-up is a full-colour representation of the proposed packaging artwork that shows how the information will appear when the pack is assembled. A specimen is an example of the actual printed packaging material and package leaflet. Their review helps assess the presentation, legibility and consistency of the information before the product is placed on the market [6].

A further regulatory consideration in the EU is the variation process. Product information may need to be revised when new safety information becomes available or when an authorised product detail changes. Such changes must be classified and submitted according to the applicable variation requirements, and the SmPC, PIL and packaging must be brought into line with the approved changes within the relevant regulatory timelines [16,24,25]. Maintaining consistency across all product-information components is important because an update in one document may require corresponding changes in the others.

The EU market also presents country-specific labelling considerations, commonly referred to as "Blue Box" requirements. In addition to harmonised EU information, certain national particulars may be required on the packaging or in the package leaflet, depending on the Member State and the authorisation route. These may include national product identification, legal supply status, reimbursement or other locally required information. Differences between national requirements and language expectations create additional work for MAHs, particularly when the same medicinal product is supplied in several European markets [15,20].

Preventing falsified medicines from entering the legal supply chain is another important objective of EU medicines regulation. Directive 2011/62/EU, commonly known as the Falsified Medicines Directive (FMD), introduced measures to strengthen the security of the legal supply chain. The safety-feature system includes a unique identifier and an anti-tampering device on the packaging of specified medicinal products. These measures support verification and help detect possible tampering, thereby contributing to patient protection [19].

Despite the established regulatory framework, manufacturers and MAHs continue to face challenges in maintaining compliant and consistent packaging and labelling across different markets. These include managing multiple language versions, incorporating country-specific Blue Box particulars, maintaining readability on small packaging surfaces, updating artwork following variations, coordinating mock-up and specimen review, and implementing safety-feature requirements. Supply-chain and market changes may add further complexity. A systematic understanding of the applicable EU requirements is therefore necessary to support regulatory compliance and reduce the risk of errors associated with medicinal product information [6,10,15,18,19,20].

METHODOLOGY

3.1 Study design

The present study was designed as a descriptive, documentary-based regulatory review to examine the regulatory requirements and current challenges associated with the labeling and packaging of medicinal products in the European Union (EU). The study focused on the regulatory framework governing product information, packaging components, marketing authorization procedures, post-authorization variations, country-specific labeling requirements and

measures introduced to prevent falsified medicines from entering the legal supply chain.

The review was based on the examination and comparison of European Union legislation, European Medicines Agency (EMA) guidelines, European Commission regulatory documents, Coordination Group for Mutual Recognition and Decentralised Procedures – Human (CMDh) guidance and published regulatory literature. The methodology was structured to understand both the formal requirements applicable to medicinal product labeling and packaging and the practical difficulties faced by pharmaceutical manufacturers when maintaining compliance across different European markets.

No human participants, animals, medicinal products or packaging materials were experimentally tested. The study relied on secondary information available in published regulatory and scientific sources. Accordingly, the findings represent a regulatory and documentary assessment rather than primary experimental research.

3.2 Sources of information

Information for the study was collected from secondary sources. Priority was given to official and legally authoritative documents because these provide the basis for regulatory obligations. The following categories of information were reviewed:

- European Union legislation, including directives and regulations governing medicinal products for human use, product information, packaging and the prevention of falsified medicines.
- EMA guidelines and procedural documents relating to the Summary of Product Characteristics (SmPC), Patient Information Leaflet (PIL), mock-ups, specimens and post-authorization procedures.
- European Commission guidance on marketing authorization procedures, product information requirements and variations to marketing authorizations.
- CMDh guidance and country-specific information relating to additional national labeling requirements, commonly referred to as Blue Box requirements.
- Published review articles and regulatory literature relating to pharmaceutical packaging, labeling, readability, serialization and supply-chain security.

The sources already listed in the main dissertation bibliography up to reference 25 were treated as the background literature for the review. Additional official regulatory sources used to support the expanded methodology are listed separately from reference 26 onwards at the end of this document. Where a regulatory requirement was described, the relevant legislation or official guidance was preferred over secondary commentary.

3.3 Regulatory framework for labeling and packaging in the EU

The European regulatory framework was reviewed to identify the legal requirements applicable to the preparation, submission and maintenance of medicinal product information. Particular attention was given to Directive 2001/83/EC, as amended, which establishes the Community code relating to medicinal products for human use. The relevant provisions were examined to understand the information required on medicinal product packaging and in package leaflets, including product identification, mandatory particulars, readability, Braille requirements and additional information that may be included by individual Member States.

The review also considered the role of the Common Technical Document (CTD), developed by the International Council for Harmonisation (ICH), in providing a harmonized structure for regulatory submissions. The European-specific Module 1 was examined, with particular attention to the product information documentation and supporting packaging material submitted as part of a marketing authorization application.

The product information and packaging documentation considered in the study included the SmPC, labeling, package leaflet, mock-ups and specimens. The precise organization and numbering of the relevant Module 1 sections were interpreted in accordance with the applicable EU submission guidance and templates, as these may be updated over time.

3.4 Components of medicinal product information

3.4.1 Summary of Product Characteristics (SmPC)

The SmPC was examined as the approved product information document intended primarily for healthcare professionals. The review focused on the standardized sections describing the medicinal product, including its name, qualitative and quantitative composition, pharmaceutical form, therapeutic indications, posology and method of administration, contraindications, special warnings and precautions for use, interactions, use during pregnancy and lactation, undesirable effects, pharmacological properties and pharmaceutical particulars.

The review considered the importance of maintaining consistency between the approved SmPC and the corresponding package leaflet and packaging information. Changes to safety information, indications, dosage or other approved particulars were considered in the context of the need for corresponding updates to product information and, where applicable, regulatory submissions.

3.4.2 Patient Information Leaflet (PIL)

The PIL was reviewed as the patient-oriented document supplied with the medicinal product. Its content was considered in relation to the standard sections explaining what the medicine is and what it is used for; information required before taking or using it; how to take or use it; possible side effects; storage instructions; and the contents of the pack and other relevant information.

Particular attention was given to clarity of instructions, readability, presentation of adverse effects, storage conditions, expiry information and consistency with the approved SmPC. The review also considered the importance of presenting the information in the language or languages required by the Member State in which the medicinal product is marketed. Where multiple language versions are needed, the information should remain consistent across versions.

3.4.3 Outer and immediate packaging

The outer and immediate packaging requirements were reviewed with reference to the applicable provisions of Directive 2001/83/EC, as amended. The information considered included the name and strength of the medicinal product, pharmaceutical form, active substance details, pack contents, route of administration, relevant warnings, storage precautions, expiry date, batch number and marketing authorization holder details, together with other particulars required by the legislation.

The review distinguished immediate packaging, which is in direct contact with the medicinal product, from outer packaging, which surrounds the immediate container. Packaging configurations such as blister packs, bottles, vials and cartons were considered in relation to the space available for mandatory information and the need to maintain legibility. The study did not perform physical packaging tests; it assessed the regulatory information requirements described in the source documents.

3.5 Review of mock-ups and specimens

The regulatory requirements relating to mock-ups and specimens were examined using EMA guidance for human medicinal products, particularly the guidance describing the checking process for centrally authorized products. A mock-up was considered as a full-colour, flat or assembled representation of the proposed packaging artwork, while a specimen was considered an actual sample of the printed packaging material and package leaflet.

The review focused on the following aspects:

1. Submission of proposed packaging artwork and draft package leaflet as part of the relevant marketing authorization procedure.
2. Review of the design, layout and presentation of outer and immediate packaging.
3. Assessment of the legibility, positioning and consistency of printed information.
4. Consistency between the mock-up, approved product information and package leaflet.
5. Submission and checking of actual specimens, where required, before the product is placed on the market.
6. Review of packaging changes following relevant post-authorization procedures, renewals or transfers of marketing authorization.

The EMA checking process was considered to understand how packaging comments may be communicated during the assessment procedure and how applicants may be required to submit revised mock-ups. The review also considered the need to plan sufficient time for specimen assessment and any corrective changes before product launch. Requirements may differ according to the authorization route and the nature of the application; therefore, the relevant procedural guidance was considered rather than assuming that one process applies identically to every product.

3.6 Review of marketing authorization procedures

The different marketing authorization procedures followed in the European Union were examined to understand how medicinal products obtain authorization for marketing in one or more Member States and how the authorization route can influence product information and packaging planning.

3.6.1 National Procedure

The National Procedure was considered where an applicant seeks marketing authorization in a single Member State. The application is submitted to the competent national authority, and the resulting authorization applies within that country.

3.6.2 Mutual Recognition Procedure

The Mutual Recognition Procedure (MRP) was reviewed in relation to products that have already received national authorization in one Member State and for which the applicant seeks recognition in additional Member States. Differences in national language and additional packaging particulars may need to be addressed when preparing product information for the concerned markets.

3.6.3 Decentralized Procedure

The Decentralized Procedure (DCP) was considered for applications submitted simultaneously to several Member States when the medicinal product has not yet received authorization in an EU Member State and is not required to follow the centralised procedure. The procedure requires coordination of the assessment and agreement on product information among the participating states.

3.6.4 Centralised Procedure

The Centralised Procedure (CP) was reviewed as the route that results in a single EU marketing authorization following scientific assessment coordinated by the EMA and a decision by the European Commission. The authorization is valid throughout the EU. The study considered the implications of this route for common product information, packaging review and country-specific information that may still be required.

The four procedures were compared in terms of geographical coverage, assessment route and implications for product information and packaging. The review specifically considered how national language requirements and additional national particulars may affect the preparation of artwork for different markets.

3.7 Review of post-authorization variations

Post-authorization variations were reviewed to understand how changes to an approved medicinal

product are managed and how such changes may affect labeling and packaging. A variation refers to a change to the terms of an existing marketing authorization. Changes may relate to administrative particulars, quality information, manufacturing arrangements, safety information or efficacy-related data. The study considered the traditional classification used in the source material and the applicable European variation framework.

3.7.1 Type IA variations

Type IA variations are minor changes that generally have no significant impact on the quality, safety or efficacy of the medicinal product and are subject to the applicable notification requirements. The review considered the importance of identifying the correct category and complying with the relevant notification timeline.

3.7.2 Type IAIN variations

Type IAIN variations are a subgroup of Type IA variations for which immediate notification is required after implementation, in accordance with the applicable regulatory requirements.

3.7.3 Type IB variations

Type IB variations are minor variations that do not fall under the Type IA or Type II categories. They generally require notification and regulatory assessment before implementation, subject to the applicable procedure.

3.7.4 Type II variations

Type II variations are major changes that may have a significant impact on the quality, safety or efficacy of a medicinal product and generally require prior approval. Examples considered in the review included changes to therapeutic indications and significant safety-related updates.

The study also considered grouping of variations where permitted, as this may allow related changes affecting one or more medicinal products to be submitted together under the relevant regulatory conditions. The classification and procedural timelines were interpreted in accordance with the applicable variation legislation and EMA procedural guidance. Because variation classifications and procedural guidance may be amended, the current legal text should be consulted before applying the classification to an actual submission.

3.8 Case study of a post-authorization labeling variation

A case study described in the source dissertation was used to illustrate the practical relationship between safety updates, variation classification and corresponding product information changes. The example concerned a centrally authorized medicinal product for which updates were made to SmPC sections 4.4 (Special warnings and precautions for use) and 4.8 (Undesirable effects). The proposed update included respiratory adverse reactions, namely interstitial pneumonitis, interstitial lung disease and pulmonary fibrosis, based on information identified through the marketing authorization holder's safety database.

The corresponding PIL was also required to be updated to maintain consistency with the revised SmPC. The example further described an associated update to Annex II and alignment with the relevant Quality Review of Documents (QRD) template. The case was examined to illustrate the following stages:

7. Identification of the proposed product information change and assessment of its regulatory significance.
8. Determination of the appropriate variation category under the applicable EU variation framework.
9. Preparation of revised SmPC and PIL text, together with the supporting variation documentation.
10. Submission of the variation to the relevant regulatory authority and management of any questions or comments.
11. Implementation of the approved product information changes and coordination of the corresponding labeling and packaging updates.

The case study was used as an illustrative example from the dissertation and was not treated as an independently verified regulatory precedent. Product identifiers were not disclosed in the source material. The example therefore demonstrates the process described in the source rather than establishing a universal timeline for all Type IB applications.

3.9 Assessment of country-specific Blue Box requirements

Country-specific packaging requirements, commonly referred to as Blue Box requirements, were reviewed to understand the additional information that may be required by individual EU Member States on the outer packaging or associated product information. The legal basis for national additional particulars was considered with reference to Article 57 of Directive 2001/83/EC, as amended, and relevant European regulatory guidance.

The comparison focused on the categories of information identified in the source dissertation and relevant country guidance:

- Legal status of the medicinal product, including whether it is subject to medical prescription or may be supplied without prescription.
- Product identification and authenticity information, including national product codes or barcodes where applicable.
- Pricing and reimbursement particulars, where required nationally.
- National symbols, pictograms and other additional labeling particulars.
- Country-specific requirements relating to the supply, distribution or dispensing of the medicinal product.

The source dissertation included a comparative table for selected countries, including Austria, Belgium, Bulgaria and Croatia. These country examples were considered to illustrate differences in legal-status statements, identification details and symbols or

pictograms. The comparison was descriptive and was not intended to represent every EU Member State or every medicinal product category. National requirements can change; therefore, the relevant national authority or current CMDh guidance should be consulted before preparing commercial packaging artwork.

3.10 Review of current challenges related to labeling and packaging

The current challenges discussed in the source material were organized into key themes to identify the practical difficulties that may arise when pharmaceutical manufacturers supply medicinal products across multiple European markets.

3.10.1 Regulatory and quality requirements across markets

The review considered the need to maintain compliance with EU product information requirements while coordinating the SmPC, PIL and outer and immediate packaging. Inaccurate or inconsistent information may create risks relating to product identification, readability, dispensing and market complaints. Frequent regulatory or safety updates may also require artwork changes within defined timelines.

3.10.2 Multiple languages and national requirements

The linguistic diversity of European markets may require multiple versions of the package leaflet and, in some cases, different packaging configurations. The preparation, translation, review and approval of these versions can increase the regulatory workload and the possibility of inconsistencies. National requirements for legal status, symbols, barcodes and other information may also require country-specific artwork.

3.10.3 Packaging artwork and supply-chain coordination

The study considered how multiple artwork versions can affect packaging design, inventory planning, manufacturing schedules and distribution. Products supplied to different countries may require different quantities, pack formats or printed particulars. Tender-based procurement and fixed delivery schedules may further increase the need for coordination between regulatory affairs, quality assurance, manufacturing, packaging and supply-chain teams.

3.10.4 Safety updates and post-approval changes

The review considered the operational impact of updating product information following new safety findings or regulatory decisions. A change to the SmPC may require a corresponding PIL update and, where relevant, changes to packaging artwork. Manufacturers must coordinate the regulatory submission, approval or notification requirements, artwork implementation and use of existing packaging stock in accordance with applicable rules.

3.10.5 Supply-chain complexity and Brexit-related considerations

The source material identified supply-chain complexity and the post-Brexit regulatory environment as additional considerations for companies distributing products across European markets. The review considered these issues as operational challenges involving market-specific requirements, distribution planning and the need to monitor applicable regulatory obligations. The study did not undertake a separate legal comparison of EU and UK requirements.

3.11 Review of the EU Falsified Medicines Directive

The EU Falsified Medicines Directive (FMD) was reviewed to understand its contribution to the prevention of falsified medicinal products entering the legal supply chain. The principal legal instruments considered were Directive 2011/62/EU, which amended Directive 2001/83/EC, and Commission Delegated Regulation (EU) 2016/161, which sets out detailed rules for the safety features appearing on the packaging of certain medicinal products.

The review considered the definition and public-health implications of falsified medicinal products, including false representation of a product's identity, source or history. The purpose of the FMD provisions was examined in relation to strengthening the security of the legitimate pharmaceutical supply chain and enabling verification of the authenticity of medicinal product packs.

3.11.1 Safety features

The two principal safety features considered were the Unique Identifier (UI) and the Anti-Tampering Device (ATD). Their functions were reviewed separately because they address different aspects of pack security.

- Unique Identifier (UI): A machine-readable code, generally carried in a two-dimensional Data Matrix, that contains specified product and pack information. The elements include the product code, a unique serial number, batch number and expiry date, together with applicable human-readable information.
- Anti-Tampering Device (ATD): A feature that enables verification of whether the outer packaging has been opened or tampered with before supply to the patient.

The study considered how the UI supports verification of individual packs through the European medicines verification system and how the ATD provides evidence of possible interference with the pack. The review also considered the roles of manufacturers, wholesalers and persons authorized to supply medicines to the public in the verification process.

3.11.2 Verification and supply-chain security

The verification process was reviewed at a general level, including the upload and management of pack information in the relevant repositories and the verification or decommissioning of the unique identifier at the appropriate point in the supply chain. The review also considered verification requirements for certain higher-risk supply-chain activities described in the delegated regulation.

The FMD safety features do not apply indiscriminately to every medicinal product. Their application depends on the scope of the legislation and the relevant product

categories, including applicable exemptions. The study therefore considered the regulatory scope rather than assuming that every medicinal product must carry identical safety features.

3.12 Data compilation and comparative analysis

Information collected from the selected sources was organized under predefined subject headings to facilitate comparison. The main categories used for compilation were:

12. Legal and regulatory requirements for medicinal product information.
13. Requirements for SmPC, PIL and outer and immediate packaging.
14. Mock-up and specimen submission and checking procedures.
15. Marketing authorization routes and their implications for packaging.
16. Variation categories and examples of post-authorization changes.
17. Country-specific Blue Box requirements.
18. Operational and regulatory challenges affecting labeling and packaging.
19. FMD safety features and verification requirements.

A qualitative descriptive approach was used to summarize the requirements and identify common themes across the documents. Regulatory provisions were compared to identify areas where a common EU framework coexists with additional national requirements. The selected country examples were summarized descriptively, while the case study was used to demonstrate how a safety-related change may lead to revisions in approved product information and packaging.

No statistical tests, quantitative measurements or inferential analyses were performed because the study did not involve a numerical dataset or primary data collection. The findings were synthesized narratively and presented in the article under relevant thematic headings.

3.13 Quality control of information

To improve the reliability of the review, official EU legislation and regulatory guidance were prioritized over informal web sources. Where a secondary source described a legal requirement, the relevant directive, regulation or official guideline was used as the preferred reference wherever available. The information was organized to distinguish general EU requirements from country-specific requirements and to distinguish the functions of the UI and ATD.

The review also considered the date and regulatory status of the documents consulted. Because EU legislation and guidance may be revised, the article should identify the version or access date of online guidance used during final manuscript preparation. Any country-specific requirement intended for practical implementation should be rechecked against the latest national guidance.

3.14 Ethical considerations

The study was based entirely on publicly available legislation, regulatory guidance and published literature. No personal data, patient records, confidential company information or identifiable human-subject information were collected. Ethical approval and informed consent were therefore not applicable to this documentary review. Sources were acknowledged through numbered references to support transparency and traceability.

3.15 Scope and limitations

The study was limited to regulatory and documentary information relating primarily to medicinal products for human use in the European Union. It focused on labeling, packaging, product information, authorization procedures, variations, Blue Box requirements and FMD-related safety features. It did not include laboratory evaluation of packaging materials, readability testing with patients, interviews with regulatory professionals, manufacturer surveys or direct inspection of commercial medicinal product packs.

The country comparison was based on selected examples available in the source dissertation and should not be interpreted as a complete survey of all Member States. In addition, the regulatory framework is subject to amendment, and some procedures or guidance documents may have been updated since the versions cited in the original dissertation. The findings should therefore be interpreted as a structured review of the selected documents and not as a substitute for checking the current legal requirements applicable to a specific product or submission.

RESULTS

The present study highlights the importance of regulatory requirements for the labeling and packaging of medicinal products in Europe. The findings indicate that proper labeling and packaging are essential for ensuring medicine quality, patient safety, and regulatory compliance.

The European regulatory framework requires three major components: Summary of Product Characteristics (SmPC), Patient Information Leaflet (PIL), and outer and immediate packaging labels. These provide essential information about the medicine, including dosage, administration, warnings, side effects, storage conditions, batch number, and expiry date.

The study also identified marketing authorization and variation management as key regulatory requirements. Any changes to approved labeling or packaging must follow the appropriate variation procedures (Type IA, IB, or II) to ensure timely regulatory compliance.

Country-specific labeling requirements, known as Blue Box requirements, were also identified as major challenges. Differences in language, national information, symbols, and legal requirements increase the complexity of marketing medicines across European countries.

Overall, effective coordination between regulatory, quality assurance, and manufacturing teams, along with proper artwork review and regular monitoring of regulatory updates, can minimize labeling errors and ensure patient safety.

CONCLUSION

The Common Technical Document (CTD), developed by the ICH, harmonizes regulatory submission requirements across different countries. The European Union has established comprehensive guidelines for medicinal product labeling and packaging, including the preparation of mock-ups and country-specific Blue Box requirements.

This study focuses on the labeling and packaging components of Module 1.3.1, namely the Summary of Product Characteristics (SmPC), Patient Information Leaflet (PIL), and outer and immediate packaging. These components play a vital role in ensuring product identification, patient safety, readability, and appropriate use of medicines.

Despite established EMA guidelines, generic manufacturers face challenges in meeting diverse national requirements, language specifications, and regulatory compliance across European markets. Marketing authorization procedures and variation classifications (Type IA, IB, and II) further contribute to regulatory complexity.

Additionally, the Blue Box requirements and Falsified Medicines Directive (FMD) strengthen medicine identification, authenticity, and supply-chain security. Overall, compliance with European labeling and packaging regulations is essential to ensure medicinal product quality, patient safety, and successful market distribution.

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CONFLICT OF INTEREST

Nil

INFORMED CONSENT

Not applicable

ETHICAL STATEMENT

Not Applicable.

REFERENCES

1. European Medicines Agency. The European Medicines Agency. Available at: https://www.ema.europa.eu/en/documents/presentation/presentation-european-medicines-agency_en.pdf.
2. European Medicines Agency. The European regulatory system for medicines: A consistent approach to medicines regulation across the European Union.
3. Bairagi PD, Darekar AB, Gondker SB, Saudagar RB. Pharmaceutical packaging materials: A brief review. World Journal of Pharmaceutical Research. 2018;7(2):482–510. doi:10.20959/wjpps20182-10914.
4. European Medicines Agency. Checking process of mock-ups and specimens of outer/immediate labelling and package leaflets of human medicinal products in the centralised procedure. 2014.
5. European Medicines Agency. Summary of Product Characteristics (SmPC). Available at: https://www.ema.europa.eu/en/documents/presentation/presentation-summary-product-characteristics-smpc_en.pdf.
6. European Commission. A guideline on the Summary of Product Characteristics. EudraLex, Volume 2.
7. Medicines and Healthcare products Regulatory Agency. Best practice guidance on the labelling and packaging of medicines. 2015.
8. European Commission. Guideline on the readability of the labelling and package leaflet of medicinal products for human use. 2009.
9. European Union. Directive 2004/27/EC amending Directive 2001/83/EC on the Community code relating to medicinal products for human use. 2004.
10. European Commission. Packaging 'Blue-Box' requirements and other information on labelling/package leaflet for products authorised via national, mutual recognition, decentralised or centralised procedures. 2018.
11. European Commission. Guideline on the details of the various categories of variations to the terms of marketing authorisations for medicinal products for human use and veterinary medicinal products. 2013.
12. European Commission. Procedures for marketing authorisation, EudraLex Volume 2A, Chapter 1. 2018.
13. Medicines and Healthcare products Regulatory Agency. Best practice guidance on the labelling and packaging of medicines. 2015.
14. European Union. Directive 2011/62/EU amending Directive 2001/83/EC as regards the prevention of the entry into the legal supply chain of falsified medicinal products. 2011.
15. European Parliament and Council. Directive 2001/83/EC on the Community code relating to medicinal products for human use, as amended.
16. European Commission. Guideline on the details of the various categories of variations to the terms of marketing authorisations. 2008.
17. European Medicines Agency. Post-authorisation procedural advice. 2010.
18. European Parliament and Council of the European Union. Directive 2011/62/EU of 8 June 2011 amending Directive 2001/83/EC as regards the prevention of the entry into the legal supply chain of falsified medicinal products. Official Journal of the European Union. 2011. Available from: https://eur-lex.europa.eu/eli/dir/2011/62/oj

19. European Commission. Commission Delegated Regulation (EU) 2016/161 of 2 October 2015 supplementing Directive 2001/83/EC by laying down detailed rules for the safety features appearing on the packaging of medicinal products for human use. Official Journal of the European Union. 2016. Available from: https://eur-lex.europa.eu/eli/reg_del/2016/161/oj
20. European Medicines Agency. Checking process of mock-ups and specimens of outer/immediate labeling and package leaflets of human medicinal products in the centralised procedure. EMA/305821/2006/Rev.4. Amsterdam: EMA; 2022. Available from: https://www.ema.europa.eu/
21. European Commission. Guideline on the packaging information of medicinal products for human use authorised by the Union. Notice to Applicants, Volume 2C. Brussels: European Commission; 2023. Available from: https://health.ec.europa.eu/medicinal-products/eudralex/eudralex-volume-2_en
22. European Medicines Agency. Pre-authorisation guidance: questions and answers on procedural and regulatory matters. Amsterdam: EMA. Available from: https://www.ema.europa.eu/en/human-regulatory-overview/marketing-authorisation/pre-authorisation-guidance
23. European Medicines Agency. Changing the labeling and package leaflet: Article 61(3) notifications. Amsterdam: EMA. Available from: https://www.ema.europa.eu/
24. European Parliament and Council of the European Union. Directive 2001/83/EC of 6 November 2001 on the Community code relating to medicinal products for human use. Official Journal of the European Communities. 2001; as amended. Available from: https://eur-lex.europa.eu/eli/dir/2001/83/oj