

Biosimilars at the Intersection of Pharmacy Ethics and Regulatory Governance: A Comparative Review of Patient Safety, Equitable Access, Interchangeability, and Accountability in India and the United Kingdom

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Abstract

Biosimilar medicines have become increasingly important in contemporary pharmaceutical care because they can expand access to complex biological therapies while potentially reducing treatment expenditure. Unlike conventional generic medicines, biosimilars are not molecularly identical copies of their reference biological products because biological medicines are inherently complex and are manufactured using living systems. Consequently, their development and clinical use require a regulatory framework based on comprehensive analytical, functional, non-clinical, and, where appropriate, clinical comparability. The ethical governance of biosimilars therefore extends beyond demonstration of pharmaceutical quality and clinical similarity to encompass patient safety, equitable access, informed decision-making, interchangeability, pharmacovigilance, professional accountability, and responsible allocation of healthcare resources.

This review examines biosimilar governance from a pharmacy ethics perspective, with

particular emphasis on India and the United Kingdom. The Indian framework has evolved through the Guidelines on Similar Biologics issued by the Department of Biotechnology and the Central Drugs Standard Control Organization, whereas the United Kingdom regulates biosimilars through the Medicines and Healthcare products Regulatory Agency and associated national healthcare policies. Both systems emphasize quality, safety, efficacy, traceability, and post-marketing surveillance, but differences exist in regulatory organization, interchangeability, pharmacy-level substitution, patient involvement in switching decisions, and implementation of pharmacovigilance. In the UK, an authorized biosimilar is considered interchangeable with its reference product from a regulatory perspective, while pharmacy-level substitution without prescriber involvement is not permitted. In India, regulatory approval establishes biosimilarity, but the practical framework for interchangeability and substitution remains less explicitly standardized across routine pharmacy practice.

From an ethical perspective, responsible biosimilar governance requires balancing individual patient interests with the collective objective of improving access to affordable biological therapies. Pharmacists have important responsibilities in product identification, patient education, adverse-event reporting, medication safety, and communication regarding switching. A patient-centred approach should avoid both unjustified resistance to biosimilars and inappropriate substitution driven solely by cost. Greater regulatory harmonization, transparent pharmacovigilance, standardized product traceability, pharmacist education, and meaningful patient participation may strengthen ethical biosimilar implementation in India and the United Kingdom.

Keywords: Biosimilars; Pharmacy ethics; Regulatory governance; Patient safety; Equitable access; Interchangeability; Pharmacovigilance; Pharmacists; India; United Kingdom.

1. Introduction

Biological medicines have transformed the management of numerous chronic, autoimmune, inflammatory, oncological, endocrine, and rare diseases. However, their molecular complexity, sophisticated manufacturing processes, and high development costs can create substantial financial barriers to treatment. Biosimilar medicines have emerged as an important component of modern pharmaceutical policy because they provide additional biological treatment options following expiry of relevant intellectual-property and regulatory exclusivity periods. The World Health Organization (WHO) has emphasized that biosimilars can contribute to increased availability and affordability of quality-assured biological medicines while maintaining appropriate standards of quality, safety, and efficacy [1-3].

A biosimilar is a biological medicine demonstrated to be highly similar to an already authorized reference biological medicine, with no clinically meaningful differences in quality, safety, or efficacy for the approved indications. Because biological products are produced through complex biological systems, biosimilars cannot generally be expected to be molecularly identical to their reference products in the same manner as conventional chemically synthesized generics [1,4].

This scientific distinction creates important ethical and professional considerations. The ethical governance of biosimilars cannot be reduced to the question of whether a product satisfies regulatory approval requirements. It also involves questions concerning whether patients can obtain necessary treatment, whether cost-containment policies are implemented fairly, whether patients receive adequate information before switching, whether pharmacists have sufficient authority and knowledge to participate in substitution decisions, and whether adverse events can be accurately attributed to individual products.

The ethical principles of beneficence, non-maleficence, autonomy, and justice provide a useful

framework for evaluating these issues. Beneficence requires healthcare systems to facilitate effective treatment and potentially broaden access through biosimilar competition. Non-maleficence requires rigorous evaluation and continued monitoring of safety and immunogenicity. Respect for autonomy requires meaningful communication with patients when treatment is changed. Justice requires that resource allocation and access policies do not unnecessarily exclude patients from effective biological treatment.

India and the United Kingdom provide informative comparative settings. India has developed a national framework for similar biologics through the Department of Biotechnology (DBT) and Central Drugs Standard Control Organization (CDSCO). In contrast, the United Kingdom has developed a mature regulatory and healthcare framework involving the Medicines and Healthcare products Regulatory Agency (MHRA) and the National Health Service (NHS). The two jurisdictions therefore provide an opportunity to examine how regulatory structures interact with pharmacy ethics and patient-centred care.

2. Aim and Objectives

2.1 Aim

This review aims to critically examine the ethical and regulatory governance of biosimilar medicines in India and the United Kingdom, with particular emphasis on patient safety, equitable access, interchangeability, pharmacovigilance, and professional accountability.

2.2 Objectives

The specific objectives are:

1. To describe the scientific and regulatory basis of biosimilar medicines.
2. To compare biosimilar regulatory governance in India and the United Kingdom.
3. To examine ethical considerations related to patient safety and switching.
4. To assess the relationship between biosimilar adoption and equitable access.
5. To compare approaches to interchangeability and pharmacy-level substitution.
6. To examine pharmacist responsibilities in biosimilar use.
7. To evaluate pharmacovigilance and product traceability requirements.
8. To identify ethical and regulatory gaps and propose recommendations for responsible biosimilar governance.

3. Review Methodology

This article uses a narrative comparative review methodology. Relevant peer-reviewed literature was identified primarily through PubMed-indexed publications concerning biosimilarity, interchangeability, switching, pharmacovigilance, access, and ethical considerations. Official regulatory and policy documents were examined from the WHO, CDSCO/DBT, MHRA, EMA, FDA, and Health Canada to provide contextual information regarding international biosimilar governance.

Priority was given to regulatory documents and peer-reviewed systematic reviews addressing:

- biosimilar regulatory principles;
- quality, safety, and efficacy;
- interchangeability and switching;
- immunogenicity;
- pharmacovigilance;
- traceability;
- patient communication;
- affordability and access;
- pharmacy and professional responsibility; and
- ethical considerations associated with non-medical switching.

The review focuses principally on India and the United Kingdom, while selected international evidence is used to contextualize broader regulatory and ethical principles.

4. Scientific and Regulatory Basis of Biosimilars

4.1 Biosimilars versus generic medicines

An important ethical issue in biosimilar communication is the distinction between a biosimilar and a conventional generic. Generic medicines are generally chemically identical to their reference products with respect to the active pharmaceutical ingredient. Biosimilars, in contrast, are highly similar biological products for which some degree of molecular microheterogeneity may naturally occur.

The WHO therefore recommends a stepwise comparability approach based on extensive analytical and functional characterization followed by appropriate non-clinical and clinical evaluation [1,2]. The revised WHO guidelines adopted in 2022 further emphasize analytical and functional characterization and allow flexibility in the amount of clinical evidence required when sufficient evidence of similarity has already been established [3].

This approach has ethical significance because unnecessary duplication of clinical development can increase development costs and delay patient access, whereas inadequate evidence could compromise confidence in product safety and effectiveness. Ethical regulation therefore requires an appropriate balance between evidence proportionality and patient protection.

4.2 Biosimilarity and clinical confidence

Regulatory approval of a biosimilar is based on demonstration of similarity rather than independent redevelopment of the entire clinical evidence base for the reference product. The underlying principle is that sufficiently established similarity can allow relevant knowledge about the reference product to contribute to the benefit-risk assessment of the biosimilar [1,3]. Evidence from switching studies has generally been reassuring. A systematic review identified 63 primary publications covering 57 switching studies and reported that most studies demonstrated comparable efficacy and safety, although the authors emphasized the need for longer-term and appropriately powered studies [5]. A subsequent systematic review involving 178 studies also found no major efficacy, safety, or immunogenicity concerns associated with switching from reference biologics to biosimilars, although attention to patient communication and possible nocebo effects remained important [6].

A 2023 systematic review and meta-analysis involving 5,252 patients found no meaningful difference in deaths, serious adverse events, treatment discontinuations, or immunogenicity between patients switched between reference products and biosimilars and those who remained on their existing treatment [7].

These findings support regulatory confidence but do not eliminate the ethical responsibility to monitor individual patients after switching.

5. Ethical Framework for Biosimilar Governance

Ethical governance can be evaluated through four classical principles of biomedical ethics.

Table 1. Ethical principles and their application to biosimilar governance



S. No .	Ethical principle	Ethical meaning in healthcare	Application to biosimilar governance	Pharmacy-related implications	India-UK relevance	Key references
1	Beneficence	Healthcare decisions should promote patient welfare and therapeutic benefit.	Biosimilars can increase the availability of biological therapies and potentially improve access through additional treatment options and affordability.	Pharmacists should support evidence-based biosimilar use, provide appropriate counselling, and facilitate continuity of effective therapy.	WHO recognizes biosimilars as a means of expanding access to quality-assured biological medicines. India has a major need for affordable biological therapies, while the UK uses biosimilars within NHS resource-management strategies.	[8,9]



2	Non-maleficence	Healthcare professionals should avoid causing preventable harm.	Biosimilar approval requires demonstration of appropriate quality, safety, and efficacy. Continued monitoring is necessary after authorization because rare or long-term adverse events may not be fully characterized before marketing.	Pharmacists should verify the product, maintain accurate records, identify adverse drug reactions, and support appropriate pharmacovigilance.	Both India and the UK require post-marketing safety monitoring. UK guidance specifically emphasizes product and batch traceability for biological medicines.	[8,10-11]
3	Respect for autonomy	Patients should receive adequate information and participate meaningfully in decisions concerning their treatment.	Patients should be appropriately informed when treatment is changed from a reference biological medicine to a biosimilar, particularly when switching is not initiated for an individual clinical reason.	Pharmacists can explain biosimilarity, expected therapeutic outcomes, monitoring requirements, and the distinction between switching and automatic substitution.	UK MHRA guidance states that switching should be decided by the prescriber in consultation with the patient under shared decision-making principles. India could further strengthen structured patient communication within biosimilar implementation.	[11-12]



4	Justice	Healthcare resources and effective treatments should be distributed fairly.	Biosimilars may improve equitable access by increasing treatment options and potentially reducing expenditure associated with biological medicines.	Pharmacists can support rational medicine selection while ensuring that cost considerations do not override patient safety or clinically relevant individual circumstances.	Particularly important in India because affordability can be a major barrier to biological treatment; also relevant to NHS resource allocation in the UK.	[8,13]
5	Professional accountability	Healthcare professionals should act competently, transparently, and in the patient's legitimate interests.	Biosimilar selection and switching should be based on regulatory evidence, clinical appropriateness, and transparent decision-making rather than inappropriate commercial influence.	Pharmacists have responsibilities for counselling, dispensing accuracy, documentation, adverse-event reporting, and medication safety.	Both regulatory environments require healthcare professionals to contribute to safe biosimilar use; UK guidance explicitly emphasizes traceability and healthcare-professional training.	[10-12]



6	Transparency	Relevant information affecting healthcare decisions should be communicated clearly and honestly.	Patients and healthcare professionals should understand why a biosimilar is being selected or why a switch is proposed, including relevant clinical and economic considerations.	Pharmacists should communicate evidence without presenting biosimilars as either inferior or identical copies of reference products.	Particularly important where switching is driven partly by procurement or cost considerations.	[8,11,13]
7	Proportionality	Regulatory and clinical requirements should be proportionate to the level of scientific uncertainty and potential risk.	Biosimilar development uses a stepwise comparability approach, beginning with extensive analytical and functional characterization and adding clinical evidence according to residual uncertainty.	Pharmacists should understand that biosimilar approval is based on a totality-of-evidence approach rather than simply assuming that clinical evidence is identical to that required for a new biological medicine.	WHO promotes a science-based, flexible approach; India and the UK incorporate comparative analytical, non-clinical, pharmacokinetic and clinical evidence within their respective frameworks.	[8,10,14]



8	Traceability	Healthcare systems should be able to identify the product associated with a patient's treatment and any adverse event.	Biological products should be identifiable by product/brand and, where appropriate, batch information to facilitate effective pharmacovigilance.	Pharmacists should record and communicate the specific biological product supplied and support accurate adverse-event reporting.	Explicitly emphasized by MHRA; strengthening product-specific traceability is also important for biosimilar pharmacovigilance in India.	[10,11]
9	Shared decision-making	Clinical decisions should incorporate professional evidence and the patient's values and preferences.	Switching between a reference product and biosimilar should consider evidence, clinical circumstances, patient concerns, and appropriate monitoring.	Pharmacists can provide unbiased medicine information and help patients understand treatment changes.	Explicitly incorporated into the UK approach to biosimilar switching; represents an important area for further development in Indian clinical practice.	[11,12]
10	Stewardship of healthcare resources	Healthcare professionals and systems have an ethical responsibility to use limited resources responsibly.	Biosimilar competition may permit healthcare systems to obtain biological treatment at lower overall cost and potentially redirect resources to other patient needs.	Pharmacists should support cost-effective medicine use without compromising quality, safety, therapeutic effectiveness, or patient involvement.	Relevant to both countries, with particular importance to affordability and access in India and NHS resource stewardship in the UK.	[9,13]

11	Trust and professional integrity	Patient trust depends on reliable, evidence-based, and ethically consistent healthcare decisions.	Concerns about biosimilar quality, switching, or commercial motivations can affect acceptance and adherence.	Pharmacists should provide balanced, evidence-based counselling and avoid overstating either benefits or risks.	Important in both countries because professional confidence and patient understanding influence biosimilar uptake.	[9,12-13]
12	Regulatory accountability	Regulatory institutions and manufacturers have continuing responsibility for product quality, safety, efficacy, and monitoring.	Biosimilar governance extends beyond marketing authorization to manufacturing quality, pharmacovigilance, traceability, post-marketing surveillance, and transparent regulatory communication.	Pharmacists form an important link between regulatory requirements and real-world medication use.	CDSCO/DBT provides India's similar-biologics framework, while MHRA provides the UK's biosimilar licensing framework.	[10-11,14]

Abbreviations: CDSCO, Central Drugs Standard Control Organization; DBT, Department of Biotechnology; MHRA, Medicines and Healthcare products Regulatory Agency; NHS, National Health Service; WHO, World Health Organization.

The table is supported by the WHO biosimilar framework, which emphasizes quality, safety, efficacy and improved access, the Indian CDSCO/DBT framework for similar biologics, and current MHRA guidance on biosimilarity, traceability, interchangeability, shared decision-making and pharmacy-level substitution. The ethical solution is not simply to prioritize cost or individual preference in isolation but to establish transparent processes in which safety, evidence, patient circumstances, and resource stewardship are considered together.

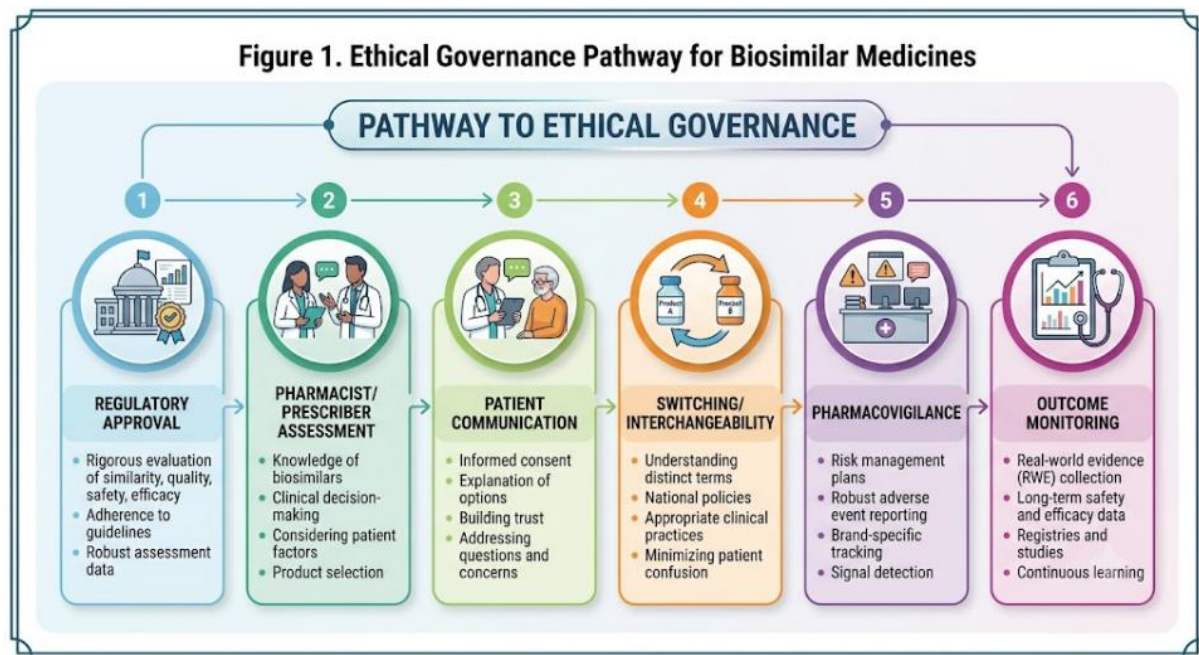


Figure 1. Ethical governance pathway for biosimilar medicines: regulatory approval → pharmacist/prescriber assessment → patient communication → switching/interchangeability → pharmacovigilance → outcome monitoring.

6. Regulatory Governance of Biosimilars in India

India established the Guidelines on Similar Biologics: Regulatory Requirements for Marketing Authorization in India through DBT and CDSCO. The 2016 guidelines provide a regulatory framework for demonstrating similarity between a proposed similar biologic and its reference biologic [8].

The Indian framework incorporates quality characterization, comparability, preclinical assessment, clinical evaluation, immunogenicity considerations, manufacturing requirements, and post-marketing surveillance. The guidelines became effective on 15 August 2016 [15].

India's biosimilar framework has considerable significance because the country is both a major pharmaceutical manufacturing environment and a large market with substantial unmet needs for affordable biological therapies. The ethical importance of biosimilars in India therefore extends beyond regulatory approval to questions of affordability, availability, quality assurance, and confidence among healthcare professionals and patients.

However, a major ethical challenge is ensuring that lower-cost access does not become associated with reduced confidence in quality. Patients should not be presented with the false assumption that lower price necessarily means inferior quality, nor should cost savings be used to obscure clinically relevant information.

7. Regulatory Governance of Biosimilars in the United Kingdom

The UK's MHRA has established specific guidance for biosimilar licensing. Current MHRA guidance incorporates experience gained since the first biosimilar authorization and emphasizes scientific comparability, traceability, and appropriate post-marketing monitoring [16].

A particularly important difference concerns interchangeability. The MHRA states that an authorized biosimilar is considered interchangeable with its reference medicinal product and

with another biosimilar to the same reference product. However, the decision to switch should involve the prescriber and patient using principles of shared decision-making. Pharmacy-level substitution without consultation with the prescriber is not permitted for biological medicines, including biosimilars [16].

The UK's pharmacovigilance framework also emphasizes accurate identification of biological products. The MHRA requires safety surveillance to distinguish individual biological products and highlights the importance of recording product and batch information [17-18].

This approach has direct pharmacy-ethics implications because accurate product identification is essential for attributing suspected adverse drug reactions to the correct biological product.

8. Comparative regulatory framework for biosimilars in India and the United Kingdom

Table 2. Comparative regulatory framework for biosimilars in India and the United Kingdom

No.	Regulatory parameter	India	United Kingdom	Ethical/regulatory implication	Reference(s)
1	Regulatory authority	Central Drugs Standard Control Organization (CDSCO), with the Department of Biotechnology (DBT) involved in the regulatory framework for similar biologics.	Medicines and Healthcare products Regulatory Agency (MHRA) is the principal UK regulatory authority for licensing biosimilar products.	Clear allocation of regulatory responsibility supports accountability and consistent oversight.	[19-20]



2	Regulatory terminology	Products are commonly termed “ Similar Biologics. ”	Products are termed “ biosimilar products. ”	Different terminology reflects jurisdiction-specific regulatory frameworks while addressing the same scientific concept of high similarity to a reference biological medicine.	[19-20]
3	Reference biological product	A similar biologic is evaluated against an approved reference biological product through a comparability exercise.	A biosimilar is compared with an authorised reference medicinal product (RMP).	Appropriate selection and characterization of the reference product are essential for scientifically valid comparison.	[19-20]



4	Development principle	Stepwise demonstration of similarity using quality, non-clinical and clinical evidence, with increasing emphasis on analytical and in-vitro characterization in the 2025 framework.	Stepwise development beginning with comprehensive physicochemical and biological characterization followed by appropriate pharmacokinetic and other studies.	A scientifically justified stepwise approach can reduce unnecessary duplication while maintaining patient protection.	[19-20]
5	Quality assessment	Requires extensive analytical characterization and assessment of critical quality attributes to demonstrate similarity with the reference biological product.	Requires comprehensive physicochemical and biological characterization, including assessment of purity, impurities, quantity, biological activity and relevant immunochemical properties.	Strong analytical comparability is central to establishing biosimilarity and minimizing uncertainty.	[19-20]



6	Non-clinical studies	The 2025 framework provides a more flexible, science-based approach to determining when in-vivo animal studies are necessary and incorporates the 3Rs principle.	The MHRA guidance adopts a scientific approach to non-clinical requirements and does not routinely require unnecessary repetition of studies when adequately justified.	Reduction of unnecessary animal experimentation supports the ethical principles of replacement, reduction and refinement.	[19-20]
7	Clinical evidence	Clinical development is based on the extent of residual uncertainty following analytical and other comparability assessments.	Clinical evidence is determined according to the residual uncertainty after analytical and pharmacological comparability; unnecessary duplication of clinical trials is discouraged.	Evidence requirements should be proportionate to residual uncertainty while maintaining safety and efficacy assurance.	[19-20]



8	Reference-product bridging	The Indian framework specifies requirements for demonstrating comparability with the reference biological product used for development.	A non-UK reference product may be used in certain circumstances if its representativeness of the UK reference product is scientifically justified, including appropriate analytical bridging.	Bridging requirements facilitate international development while preserving scientific comparability.	[19-20]
9	Marketing authorization pathway	Provides a specific regulatory pathway for marketing authorization of similar biologics, incorporating quality, non-clinical, clinical and post-marketing requirements.	Provides a dedicated licensing pathway for biosimilar products under the UK medicines regulatory framework.	Dedicated pathways can promote predictable regulation while avoiding unnecessary duplication of evidence.	[19-20]



10	Interchangeability	Interchangeability and substitution are governed by the applicable Indian regulatory and clinical framework and should not be assumed solely from biosimilar approval.	MHRA considers a licensed biosimilar to be interchangeable with its reference product when supported by the applicable regulatory framework; prescribing and switching arrangements remain clinically relevant.	Biosimilarity, interchangeability and automatic substitution are distinct concepts and should be communicated clearly.	[19-20]
11	Pharmacovigilance	Post-marketing surveillance is required to monitor safety and identify adverse events and other emerging risks.	Pharmacovigilance is required, with appropriate identification of biological products involved in suspected adverse reactions.	Continuous safety monitoring is essential because pre-authorization studies cannot identify every potential risk.	[19-20]
12	Product identification and traceability	Post-marketing monitoring requires appropriate identification and traceability of the marketed biological product.	MHRA specifically emphasizes identification of the biological medicine by brand name and batch number in adverse-reaction reporting.	Accurate product and batch identification improves signal detection and attribution of adverse events.	[19-20]



13	Manufacturing requirements	Manufacturers must demonstrate consistency and control of the manufacturing process and comply with applicable quality and regulatory requirements.	Biosimilar applications must provide evidence concerning manufacturing processes and analytical comparability consistent with applicable UK requirements.	Manufacturing consistency is fundamental to maintaining product quality throughout the lifecycle.	[19-20]
14	Lifecycle management	The 2025 Indian framework incorporates updated scientific considerations and continued regulatory oversight following authorization.	UK regulation applies a lifecycle approach with continued pharmacovigilance and regulatory oversight following marketing authorization.	Lifecycle regulation supports continuing assessment of benefit-risk and product quality after approval.	[19-20]

15	Overall regulatory emphasis	Increasing alignment with contemporary international scientific principles, particularly strengthened analytical characterization and flexible evidence requirements based on scientific justification.	Science- and risk-based assessment emphasizing comprehensive analytical similarity and avoidance of unnecessary duplication of clinical or non-clinical studies.	Both systems increasingly emphasize scientific proportionality, analytical evidence, patient safety and regulatory efficiency.	[19-20]
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Source: Compiled from the CDSCO/DBT Guidelines on Similar Biologics: Regulatory Requirements for Marketing Authorization in India (2025) and the MHRA Guidance on the licensing of biosimilar products, updated February 2

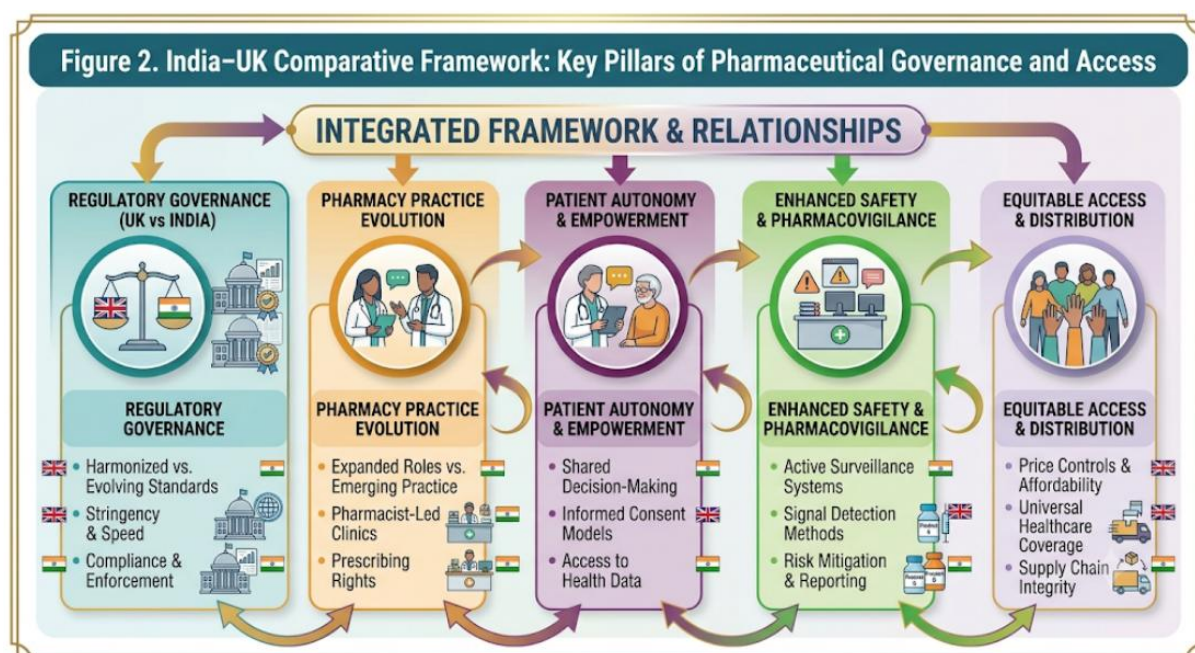


Figure 2. India-UK comparative framework showing the relationship between regulatory governance, pharmacy practice, patient autonomy, safety, and equitable access.

9. Patient Safety and Non-Maleficence

Patient safety is the primary ethical obligation in biosimilar use. Regulatory similarity does not

eliminate the need for continuing pharmacovigilance because biological products may exhibit complex immunogenicity and product-specific adverse effects.

A systematic review of switching evidence found generally comparable efficacy and safety outcomes following switches between reference biologics and biosimilars [5]. Another systematic review identified no major efficacy, safety, or immunogenicity concerns following switching, while also noting the potential contribution of nocebo effects to treatment discontinuation [6].

The ethical implication is that healthcare professionals should avoid two extremes:

1. Unjustified rejection of biosimilars based on the misconception that all biosimilars are inherently inferior; and
2. Uncritical switching without appropriate patient information, clinical consideration, monitoring, or documentation.

A patient-centred approach should recognize the evidence supporting biosimilar use while maintaining appropriate monitoring.

10. Equitable Access and Justice

One of the strongest ethical arguments for biosimilars is their potential to improve access to biological medicines. The WHO explicitly recognizes affordability and access as important considerations in biosimilar policy [1,3].

Biological therapies can impose substantial costs on healthcare systems and patients.

Biosimilar competition can create additional treatment options and potentially reduce expenditure. However, the relationship between biosimilar availability and actual patient access is not automatic. Market competition, reimbursement policy, procurement systems, intellectual-property issues, prescribing practices, professional confidence, and patient acceptance can all influence uptake [12].

Therefore, regulatory approval should be regarded as necessary but not sufficient for equitable access.

From an ethical perspective, justice requires translating cost savings into meaningful improvements in access rather than using them solely to reduce expenditure. At the same time, healthcare systems have a legitimate responsibility to use limited resources efficiently.

This creates an ethical tension between:

individual therapeutic preference and collective healthcare resource stewardship.

Transparent decision-making, evidence-based reimbursement policies, and appropriate patient communication can help reconcile these interests.

11. Interchangeability and Switching

Interchangeability is one of the most ethically sensitive areas of biosimilar policy.

The terms biosimilarity, interchangeability, switching, and substitution should not be treated as synonymous.

Biosimilarity concerns scientific similarity between a biosimilar and reference product.

Interchangeability concerns whether one product can appropriately replace another.

Switching refers to changing a patient's treatment from one biological product to another.

Substitution generally refers to dispensing one product in place of another, potentially without direct prescriber involvement.

The UK's MHRA explicitly considers authorized biosimilars interchangeable with reference products and other biosimilars associated with the same reference product, but does not permit pharmacy-level substitution without prescriber consultation [16].

Evidence from systematic reviews supports the clinical feasibility of switching, although long-

term monitoring remains important [5-7].

Ethically, switching decisions should incorporate:

- clinical indication;
- available evidence;
- patient-specific circumstances;
- treatment stability;
- patient understanding;
- monitoring requirements;
- product traceability;
- economic considerations; and
- appropriate professional communication.

The principle of autonomy does not necessarily mean that every patient has an absolute right to reject any economically motivated change. Rather, it requires that patients receive adequate information and that their concerns are considered within a clinically appropriate decision-making process.

12. Patient Autonomy and Shared Decision-Making

Patient autonomy is particularly relevant when switching occurs in a stable patient who is already responding to a reference biological medicine.

Patients may have concerns about:

- whether the biosimilar is equally effective;
- whether adverse reactions may occur;
- whether the switch is medically necessary;
- whether the change is motivated primarily by cost;
- whether future switching will occur again; and
- whether the patient will have access to the same product in the future.

Survey evidence indicates that both healthcare professionals and patients may have knowledge gaps and concerns regarding biosimilar switching and pharmacist-led substitution [21].

The ethical responsibility of pharmacists and other healthcare professionals therefore includes risk communication without misinformation. Communication should explain that biosimilars are not identical to reference biologics but are authorized on the basis of evidence demonstrating high similarity and absence of clinically meaningful differences within the regulatory framework.

The UK guidance specifically places switching within a prescriber-patient shared decision-making context [16]

13. Role of Pharmacists in Ethical Biosimilar Use

Pharmacists occupy a critical position between regulatory policy and patient care.

Their responsibilities can be summarized as follows.

13.1 Patient education

Pharmacists should explain the nature of biosimilars, expected therapeutic outcomes, potential benefits, and the reason for treatment changes when appropriate.

13.2 Product identification

Biological products should be documented using product-specific information rather than relying exclusively on the non-proprietary substance name. This is particularly important for pharmacovigilance [17,18].

13.3 Pharmacovigilance

Pharmacists should recognize and report suspected adverse reactions and ensure that the

correct biological product and, where applicable, batch information are identified.

13.4 Supporting informed decisions

Pharmacists can help patients understand the distinction between biosimilarity, interchangeability, switching, and substitution.

13.5 Avoiding conflicts of interest

Professional recommendations should be based on evidence, patient welfare, and legitimate healthcare-system considerations rather than inappropriate commercial incentives.

13.6 Medication continuity

When patients move between healthcare settings, pharmacists can support accurate documentation and communication to reduce the risk of unintended switching or duplication. Health Canada similarly identifies healthcare professionals as important contributors to patient education and pharmacovigilance for biosimilars, illustrating the broader international relevance of the pharmacist's role [21].

14. Pharmacovigilance and Traceability

Pharmacovigilance is an ethical requirement because pre-authorization studies cannot capture every possible adverse event occurring in large and diverse populations.

The UK specifically emphasizes product and batch identification when reporting suspected adverse reactions to biological medicines [23]. Such traceability is important because several biological products may contain the same active substance while being manufactured by different companies.

The ethical principles of non-maleficence and accountability require that adverse events can be attributed to the appropriate product. Failure to maintain adequate traceability could compromise both individual patient safety and the reliability of population-level safety surveillance.

India should continue strengthening product-specific pharmacovigilance, electronic traceability, professional reporting, and patient awareness to support confidence in biosimilar use.

15. Regulatory Accountability

Regulatory accountability involves more than granting marketing authorization. It includes responsibility throughout the product lifecycle.

Table 3. Ethical dimensions of regulatory accountability

S.No.	Stakeholder	Major ethical responsibility
1.	Regulatory authority	Evidence-based approval, safety monitoring and transparency
2.	Manufacturer	Quality manufacturing, accurate information and pharmacovigilance
3.	Prescriber	Appropriate prescribing and clinically justified switching
4.	Pharmacist	Product verification, patient counselling and ADR reporting
5.	Healthcare institution	Procurement, documentation, training and medication safety

6.	Payer	Responsible resource allocation without compromising patient safety
7.	Patient	Participation in treatment decisions and reporting suspected adverse effects

Regulatory accountability is particularly important when economic incentives influence biosimilar adoption. Cost containment is ethically legitimate when implemented transparently and without compromising clinical care. However, financial considerations should not replace evidence-based clinical decision-making.

16. Ethical Tension Between Cost Containment and Patient Choice

The introduction of biosimilars creates an important ethical question:

A lower-cost biosimilar can potentially allow a healthcare system to treat more patients within a fixed budget. This creates an ethical justification based on distributive justice. However, patients may reasonably expect continuity of treatment and participation in decisions affecting their therapy.

The literature on non-medical switching highlights this tension. Ethical and legal discussions have emphasized the conflict that may arise when payers promote switching primarily to reduce expenditure [22].

The appropriate approach is therefore not simply to classify switching as either ethical or unethical. Instead, decision-making should consider:

- 1.the strength of comparative clinical evidence;
- 2.patient-specific clinical circumstances;
- 3.availability of alternative products;
- 4.transparency of the economic rationale;
- 5.patient communication;
- 6.monitoring after switching; and
- 7.the possibility of reverting or modifying therapy when clinically justified.

17. India-UK Ethical Comparison

Table 4. Major ethical issues in India and the UK

S.No.	Ethical issue	India	UK
1	Patient safety	Regulatory comparability and post-marketing monitoring	Strong regulatory comparability and established pharmacovigilance
2	Patient autonomy	Requires strengthening through structured communication	Explicitly incorporated into shared decision-making



3	Equitable access	Major consideration because of treatment affordability and healthcare disparities	Important in NHS resource allocation and biological medicine access
4	Interchangeability	Regulatory/practice framework less explicitly standardized	Explicitly recognized by MHRA
5	Pharmacy substitution	Requires clearer standardized policy	Pharmacy-level substitution without prescriber consultation not permitted
6	Pharmacist role	Education, dispensing, monitoring and ADR reporting	Education, safe dispensing, traceability and pharmacovigilance
7	Traceability	Increasingly important	Explicitly emphasized by MHRA
8	Economic considerations	Highly relevant to affordability	Relevant to NHS resource stewardship
9	Regulatory accountability	Shared DBT/CDSCO framework	MHRA-led framework with NHS implementation context

18. International Context

The ethical governance of biosimilars is not limited to India and the UK. Other regulatory systems provide useful comparative lessons.

The European Medicines Agency and Heads of Medicines Agencies have stated that EU-authorized biosimilars are scientifically interchangeable with their reference medicines and

with biosimilars of the same reference product, while decisions concerning pharmacy-level substitution remain the responsibility of individual EU Member States [16].

In the United States, the FDA distinguishes between biosimilars and interchangeable biosimilars. Interchangeable products satisfy additional statutory requirements relating to substitution, while pharmacy substitution remains subject to applicable state law [17,18]. Canada provides another model in which Health Canada authorization does not itself establish provincial interchangeability. Decisions concerning interchangeability and substitution are made under provincial and territorial frameworks [28].

These international differences demonstrate that scientific biosimilarity and legal interchangeability are related but distinct concepts.

19. Key Ethical Challenges

The principal ethical challenges identified through this review are:

19.1 Information asymmetry

Patients may not understand the difference between biosimilars and generics. This can result either in unjustified fear or inappropriate assumptions about equivalence.

19.2 Non-medical switching

Switching motivated primarily by economic or formulary considerations may create concerns regarding autonomy and trust.

19.3 Pharmacist authority

Different jurisdictions assign different responsibilities to pharmacists concerning biological substitution.

19.4 Product traceability

Failure to identify the exact product can compromise pharmacovigilance.

19.5 Commercial influence

Manufacturer, payer, and institutional financial incentives can influence biosimilar selection.

19.6 Unequal access

Regulatory approval does not guarantee availability or affordability for all patient populations.

19.7 Professional education

Insufficient knowledge among healthcare professionals may contribute to inappropriate prescribing, dispensing, or patient counselling. Survey evidence indicates continuing knowledge and confidence gaps among some healthcare professionals and patients [13].

20. Recommendations for Ethical Biosimilar Governance

Based on the comparative analysis, the following recommendations are proposed.

20.1 Strengthen pharmacist education

Pharmacy curricula and continuing professional development should include biosimilarity, interchangeability, immunogenicity, pharmacovigilance, traceability, and ethical decision-making.

20.2 Standardize product identification

Electronic prescribing, dispensing, and pharmacovigilance systems should facilitate identification of the specific biological product and manufacturer.

20.3 Strengthen patient communication

Patients should receive clear, evidence-based information before clinically significant switching decisions.

20.4 Separate biosimilarity from automatic substitution

Regulatory recognition of biosimilarity should not automatically be interpreted as unrestricted pharmacy-level substitution.

20.5 Improve pharmacovigilance

Both countries should continue developing electronic systems for product-specific adverse-event reporting and long-term safety monitoring.

20.6 Promote transparent economic policies

Healthcare systems should explain the economic rationale for biosimilar adoption while maintaining clinical and ethical safeguards.

20.7 Encourage evidence-based switching

Switching should be supported by available scientific evidence, appropriate clinical assessment, patient communication, and monitoring.

20.8 Improve regulatory harmonization

International alignment of scientific standards could reduce unnecessary duplication in biosimilar development while preserving national responsibilities for patient safety and healthcare delivery. WHO's revised biosimilar guidance specifically seeks to facilitate scientifically appropriate regulatory convergence [3].

21. Future Perspectives

The future governance of biosimilars will increasingly depend on integration between regulatory science, pharmacy practice, pharmacovigilance, health economics, and ethics. Real-world evidence will become increasingly important for evaluating long-term safety, multiple switching, immunogenicity, and treatment persistence. Digital health systems may improve traceability and enable more efficient pharmacovigilance.

Artificial intelligence and electronic health records could also support identification of product-specific safety signals. However, technological development should not replace professional judgment or patient involvement.

For India, strengthening the practical integration of biosimilar policy into pharmacy and clinical practice is particularly important. The UK provides an example of a system in which regulatory interchangeability is clearly articulated while pharmacy-level substitution remains restricted without prescriber involvement [9].

Future research should therefore examine:

- patient attitudes toward biosimilar switching in India;
- pharmacist knowledge and attitudes;
- real-world outcomes following multiple switches;
- economic effects of biosimilar adoption;
- pharmacovigilance reporting quality;
- ethical frameworks for non-medical switching; and
- comparative effects of different substitution policies.

22. Conclusion

Biosimilars represent an important opportunity to expand access to biological medicines while supporting more sustainable healthcare systems. Their ethical governance, however, requires more than regulatory demonstration of similarity. Patient safety, equitable access, patient autonomy, interchangeability, pharmacovigilance, traceability, professional responsibility, and transparent resource allocation must be considered throughout the biosimilar lifecycle.

The comparison between India and the United Kingdom demonstrates substantial convergence in the scientific principles underlying biosimilar authorization but differences in the practical governance of interchangeability, substitution, patient involvement, and implementation. The UK framework explicitly recognizes interchangeability while maintaining prescriber involvement in switching and prohibiting pharmacy-level substitution without consultation. India's regulatory framework provides a substantial foundation for similar biologics but would benefit from continued development of clearly articulated pharmacy-practice policies, standardized traceability, patient communication, and professional education.

From a pharmacy-ethics perspective, the central objective should be to establish a system in which biosimilar adoption is scientifically justified, ethically transparent, patient-centred, and socially responsible. Pharmacists can play a central role by ensuring accurate product identification, patient education, pharmacovigilance, and responsible medication management. Ultimately, ethical biosimilar governance requires a balance between individual patient welfare and the legitimate societal goal of achieving equitable access to effective biological therapies.

References

1. World Health Organization. Guidelines on evaluation of similar biotherapeutic products (SBPs). WHO Technical Report Series No. 977, Annex 2. Geneva: World Health Organization; 2010.
2. World Health Organization. Guidelines on evaluation of monoclonal antibodies as similar biotherapeutic products (SBPs). WHO Technical Report Series No. 1004, Annex 2. Geneva: World Health Organization; 2017.
3. World Health Organization. Guidelines on evaluation of biosimilars. WHO Technical Report Series. Geneva: World Health Organization; 2022.
4. Monga A, Gagan, Jamwal P, Sharma S, Kaur A. Biosimilars: a critical review of development, regulatory landscape, and clinical implications. *AAPS PharmSciTech*. 2025;26(1):46. doi:10.1208/s12249-025-03038-2.
5. McKinnon RA, Cook M, Liauw W, Marabani M, Marschner I, Packer N, et al. Biosimilarity and interchangeability: principles and evidence: a systematic review. *BioDrugs*. 2018;32(1):27-52. doi:10.1007/s40259-017-0256-z.
6. Barbier L, Ebbers HC, Declerck P, Simoens S, Vulto AG, Huys I. The efficacy, safety, and immunogenicity of switching between reference biopharmaceuticals and biosimilars: a systematic review. *Clin Pharmacol Ther*. 2020;108(4):734-755. doi:10.1002/cpt.1836.
7. Herndon TM, Ausin C, Brahme NN, Schrieber SJ, Luo M, Andrada FC, et al. Safety outcomes when switching between biosimilars and reference biologics: a systematic review and meta-analysis. *PLoS One*. 2023;18(10). doi:10.1371/journal.pone.0292231.
8. World Health Organization. Guidelines on evaluation of biosimilars. WHO Technical Report Series No. 1043, Annex 3. Geneva: World Health Organization; 2022.
9. World Health Organization. Biosimilars access toolkit. Geneva: World Health Organization; 2022 [cited 2026 Sep 30].
10. Department of Biotechnology, Ministry of Science and Technology, Government of India; Central Drugs Standard Control Organization, Ministry of Health and Family Welfare. Guidelines on similar biologics: regulatory requirements for marketing authorization in India. New Delhi: DBT and CDSCO; 2016.
11. Medicines and Healthcare products Regulatory Agency. Guidance on the licensing of biosimilar products. London: MHRA; 2021 [updated 2025 Feb 27].
12. Barbier L, Ebbers HC, Declerck P, Simoens S, Vulto AG, Huys I. The efficacy, safety, and immunogenicity of switching between reference biopharmaceuticals and biosimilars: a systematic review. *Clin Pharmacol Ther*. 2020;108(4):734-755. doi:10.1002/cpt.1836.
13. World Health Organization. Promoting the use of quality-assured generic and biosimilar medicines: WHO guideline on country pharmaceutical pricing policies. Geneva: World Health Organization; 2021.
14. World Health Organization. Guidelines on evaluation of similar biotherapeutic products (SBPs). WHO Technical Report Series No. 977, Annex 2. Geneva: World Health Organization; 2010.
15. Department of Biotechnology, Ministry of Science and Technology, Government of India; Central Drugs Standard Control Organization, Ministry of Health and Family Welfare,

- Government of India. Guidelines on similar biologics: regulatory requirements for marketing authorization in India. New Delhi: DBT and CDSCO; 2016.
16. Medicines and Healthcare products Regulatory Agency. Guidance on the licensing of biosimilar products. London: MHRA; 2021 [updated 2025].
 17. Medicines and Healthcare products Regulatory Agency. Reporting suspected adverse drug reactions to vaccines and biological medicines. Drug Safety Update. London: MHRA.
 18. Medicines and Healthcare products Regulatory Agency. Guidance on pharmacovigilance procedures. London: MHRA; 2026.
 19. Central Drugs Standard Control Organization, Department of Biotechnology, Government of India. Guidelines on Similar Biologics: Regulatory Requirements for Marketing Authorization in India. New Delhi: CDSCO, Ministry of Health and Family Welfare; 2025.
 20. Medicines and Healthcare products Regulatory Agency. Guidance on the licensing of biosimilar products. London: MHRA; 2025 Feb 27.
 21. Simoens S, Verbeken G, Huys I. Biosimilars and market access: a question of comparability and costs? *Target Oncol.* 2012;7(4):227-231. doi:10.1007/s11523-011-0192-7.
 22. Provider and patient knowledge gaps on biosimilars: insights from surveys. PubMed-indexed review. 2022.
 23. Health Canada. Handbook for health care professionals on biosimilar biologic drugs. Ottawa: Health Canada; 2023.
 24. The law and ethics of switching from biologic to biosimilar in Canada. *J Can Assoc Gastroenterol.* 2020. doi:10.1093/jcag/gwzo43.
 25. European Medicines Agency; Heads of Medicines Agencies. Statement on the scientific rationale supporting interchangeability of biosimilar medicines in the European Union. Amsterdam: EMA; 2022.
 26. U.S. Food and Drug Administration. Biosimilars guidance documents and resources. Silver Spring: FDA.
 27. U.S. Food and Drug Administration. FDA updates guidance on interchangeability. Silver Spring: FDA; 2024.
 28. Health Canada. Biosimilar biologic drugs: fact sheet. Ottawa: Health Canada.