The American Journal of Medical Sciences and Pharmaceutical Research
ISSN 2689-1026 Volume 08 - 2026

Multicriteria Decision Modeling for the Inclusion of Generic Medicines and Biosimilars in Reimbursement Systems

Ivan Metelkin
Researcher in Pharmacoeconomics and Health Economics with expertise in Health Technology Assessment (HTA), economic evaluation of medical technologies and evidence-based healthcare decision-making.

Received: 11 July 2026 | Received Revised Version: 22 July 2026 | Accepted: 14 Aug 2026 | Published: 11 Sep 2026

Volume 08 Issue 09 2026 | DOI: 10.37547/tajmspr/Volume08Issue09-01

Abstract

Reimbursement systems face steady pressure to control pharmaceutical spending while protecting patient access, and off patent competition from generic medicines and biosimilars is a practical lever for this balance. In the United States, generic and biosimilar medicines produced 467 billion dollars in savings during 2024, yet the criteria that govern their inclusion in formularies remain uneven, and price often dominates. This article examines how multicriteria decision analysis can structure inclusion decisions for generics and biosimilars in reimbursement systems. Using comparative analysis, a structured review of peer reviewed methodological and applied literature, and content analysis of policy and regulatory documentation, the study organizes the relevant value dimensions into a coherent decision model. The results present an adapted workflow, a criterion set with indicative weights, and a worked application that separates the generic decision from the biosimilar decision. The work concludes that a transparent, weighted model improves consistency and supply resilience. Payers, health technology assessment analysts, and formulary committees will find the framework directly applicable.

Keywords: multicriteria decision analysis, generic medicines, biosimilars, reimbursement, health technology assessment, Pharmacoeconomics, formulary decision making, value assessment, budget impact, real-world evidence.

Cite This Article: Metelkin, I. (2026). Multicriteria Decision Modeling for the Inclusion of Generic Medicines and Biosimilars in Reimbursement Systems. The American Journal of Medical Sciences and Pharmaceutical Research, 8(09), 16–27. https://doi.org/10.37547/tajmspr/Volume08Issue09-01

Introduction

Health systems in high income countries carry a growing pharmaceutical bill, and payers look to off patent competition to keep coverage affordable. In the United States, generic and biosimilar medicines accounted for about 90 percent of prescriptions filled in 2024 while representing only 12 percent of prescription spending, and they generated 467 billion dollars in savings that year, part of more than 3.4 trillion dollars over the preceding decade [1]. Savings from biosimilars alone rose to 20.2 billion dollars in 2024, up from 12.4 billion dollars in 2023, and reached 56.2 billion dollars since the first biosimilar entry in 2015 [1, 2]. The regulatory setting is also shifting. Since 2020 the Food and Drug Administration has approved 26 interchangeable biosimilars, with annual approvals rising from 2 in 2021 to 15 in 2024, while the average review time for these applications fell from 798 days for applications dated 2020 to 364 days for applications dated 2024 [3]. These figures point to a widening supply of substitutable

products and, with it, a growing number of inclusion decisions for payers.

Inclusion decisions for generics and biosimilars are related but not identical, even though both involve off patent competition. A generic small molecule is chemically identical to its reference and, once approved, is treated as substitutable in most settings. A biosimilar is a biologic that is highly similar to its reference product, and its adoption depends on additional considerations such as interchangeability status, clinician confidence, and supply security [3, 15]. When award and listing decisions rely on price alone, short term savings can come at the cost of supplier exit, market concentration, and shortage risk, a pattern documented in procurement analysis [18]. A decision method that captures more than price is therefore needed.

Multicriteria decision analysis (MCDA) offers such a method. It structures a decision around explicit criteria, scores each option on those criteria, applies weights that reflect stakeholder priorities, and aggregates the results into an overall value estimate [4, 5]. MCDA has been applied to pricing and reimbursement, benefit risk assessment, and off patent procurement in several settings [6, 7, 9, 10, 11]. The gap addressed here is specific. Much of the applied MCDA literature treats off patent medicines as a single category or focuses on innovative products, and it rarely separates the generic decision from the biosimilar decision inside one reimbursement model, even though the two-carry different evidence and supply profiles [6, 12].

The aim of this study is to show how multicriteria decision modeling can structure the inclusion of generic medicines and biosimilars in reimbursement systems, and to organize the relevant value dimensions into a single, transparent decision model that distinguishes the two product types. **The scientific novelty** of this work lies in a structured comparative synthesis that specializes established multicriteria decision logic to the distinction between generic medicines and biosimilars within reimbursement decisions, rather than in the construction of a new algorithm. **The working hypothesis** is that a weighted, multicriteria model, in which the weight profile shifts between generic and biosimilar decisions, produces more consistent and more supply resilient listing outcomes than price led selection.

This study has limitations that readers should keep in view. It is a methodological synthesis rather than an empirical trial, so the criteria weight it presents are indicative and are meant to be recalibrated by each player with its own stakeholder panel. The worked application uses illustrative product archetypes rather than a full dataset, and the framework is presented for the United States setting while drawing on international evidence, so some criteria may need local adjustment. None of these points changes the core logic of the model; they mark where empirical follow up would add value.

The work is intended to be useful in practice. A transparent, weighted model gives formulary committees, Medicare and commercial payers, and health technology assessment analysts a shared language for inclusion decisions, and it makes the reasoning behind a listing auditable. For the United States, where prescription drug affordability remains a policy priority and where off patent medicines already carry the majority of prescription volume, a structured method that protects both savings and supply supports the resilience of the drug supply and the sustainable growth of the biosimilar market [1, 3]. The author's background in pharmacoeconomics and health technology assessment, including earlier methodological work on cost-effectiveness analysis and its use in real clinical settings [19, 20], connects that applied experience to the reimbursement questions that a maturing off patent market now raises for the country.

Materials and Methods

This study uses a qualitative, methodological design that combines three approaches. First, a comparative analysis contrasts the decision context of generic medicines with that of biosimilars, focusing on the evidence base, substitution rules, price behavior, and supply structure that shape each decision. Second, a structured review of the peer reviewed literature identifies the criteria, weighting techniques, and scoring methods used in multicriteria decision analysis for pharmaceutical value assessment. Third, a content analysis of policy, regulatory, and analytical documentation grounds the model in the current United States and international setting. The three approaches were applied in sequence, so that the comparative analysis framed the questions, the literature review supplied the method, and the document analysis supplied the current data.

The source base was drawn from four types of material. The first type is peer reviewed methodological literature on MCDA in health care, including the two reports of the ISPOR MCDA task force and later methodological work on MCDA for health technology assessment and on weighting methods [4, 5, 6, 8]. The second type is peer reviewed applied studies that build MCDA tools for off patent and biosimilar decisions in different health systems [7, 9, 10, 11, 12, 14]. The third type is regulatory and analytical documentation, including work on interchangeable biosimilar designation and its trends [3], a national value assessment framework [16], and industry and institute reports that quantify savings and market sustainability [1, 2, 18]. The fourth type is real-world evidence on biosimilar uptake and prior methodological work by the author [15, 17, 19, 20].

The theoretical core of the model rests on the ISPOR task force reports and on later methodological syntheses that describe how to define criteria, score options, and elicit weights [4, 5, 6, 8]. The applied grounding rests on MCDA tools built for off patent procurement and value-based purchasing, which show which criteria payers use beyond price [9, 10, 11]. The market and policy grounding rests on savings reporting and on the regulatory trend toward interchangeability [1, 2, 3]. Data reported in the figures and tables were taken from these sources, and each object states its basis in a note beneath it. No new empirical data were collected, which keeps the contribution at the level of a transparent decision model rather than a validated instrument.

Results and Discussion

The starting point for a reimbursement model is that generic medicines and biosimilars pose related but separate decisions. A generic is a chemically identical copy of a small molecule reference. Its bioequivalence is established through defined studies, and once approved it is substitutable at the pharmacy in most jurisdictions. A biosimilar is a biologic that is highly similar to a reference biologic, with no clinically meaningful differences in safety or efficacy, but it is a larger and more complex molecule produced in living systems. Its route to routine substitution runs through the interchangeability designation, clinician and patient confidence, and a supply base that is narrower than the generic supply base [3, 15]. These differences matter for a payer because they change which criteria carry weight and how much evidence a listing decision need.

To make the contrast concrete, Table 1 sets the two decision contexts side by side across the dimensions that a reimbursement committee weigh. The table is a synthesis rather than a copy of any single source, and it draws together the regulatory, clinical, and market points that appear across the reviewed literature.

Table 1. Comparison of the reimbursement decision context for generic medicines and biosimilars (compiled by the author based on [3, 5, 6, 15]).

Dimension	Generic medicines	Biosimilars
Molecular basis	Chemically identical small molecule	Highly similar biologic, larger and more complex
Evidence for equivalence	Bioequivalence studies	Analytical and clinical comparability, sometimes switching data
Substitution at pharmacy	Routine in most settings	Depends on interchangeability status and state rules
Price behavior after entry	Steep and rapid erosion	Slower, moderated discounting
Supply structure	Many suppliers, concentration risk over time	Fewer suppliers, higher entry cost
Main uncertainty for payers	Shortage and quality continuity	Clinician confidence, switching, supply security
Suggested MCDA emphasis	Cost and supply resilience	Clinical confidence, interchangeability, supply, cost

The scale of the biosimilar decision is also growing at the level of substitution rules. By 2024, 46 states permitted pharmacy substitution of an interchangeable biosimilar without separate physician consent, and single reference products now carry several interchangeable options, with seven interchangeable biosimilars for ustekinumab and six for adalimumab [3]. A committee is therefore no longer choosing between a reference biologic and one biosimilar. It is ranking a set of near equivalent products, which is the situation multicriteria decision analysis is built to handle, because it separates the criteria that distinguish otherwise similar options and makes the ranking explicit.

Two points follow from Table 1. First, price led selection maps poorly onto the biosimilar decision, because the value that a biosimilar adds depends on confidence and continuity as much as on discount. Second, the generic decision is not purely about price either. As entry drives prices down, the number of viable suppliers can fall, and a decision that rewards only the lowest bid can leave a payer exposed to shortages. This is visible in procurement systems where single winner, price only awards have coincided with supplier exit and thin markets [18]. A model that carries supply resilience as an explicit criterion addresses this directly, and it does so without discarding the cost focus that makes patent competition valuable in the first place.

The scale of value at stake is large enough that the quality of the decision method matters. Figure 1 shows the recent trajectory of savings from generic and biosimilar medicines in the United States, with the biosimilar contribution drawn on a second axis so that its faster growth is visible against the larger total.

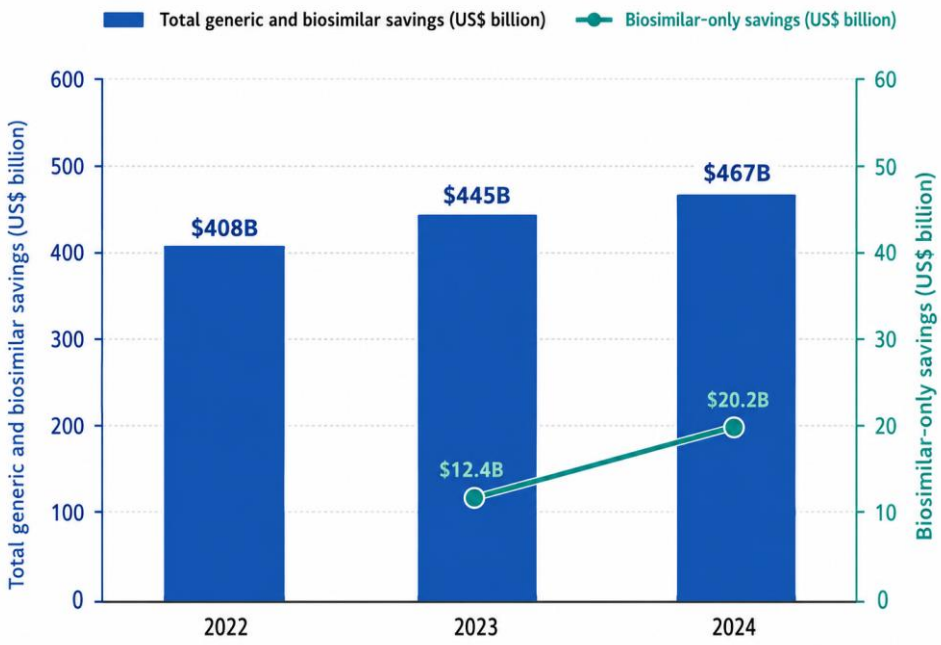

Figure 1. United States savings from generic and biosimilar medicines, 2022 to 2024, with biosimilar only savings (compiled by the author based on [1, 2]).

The pattern in Figure 1 is steady growth. Total savings rose from 408 billion dollars in 2022 to 445 billion dollars in 2023 and 467 billion dollars in 2024 [1, 2]. The biosimilar contribution nearly doubled between 2023 and 2024, from 12.4 billion dollars to 20.2 billion dollars [1]. At the same time, generic and biosimilar medicines represented about 90 percent of prescriptions filled but only 12 percent of prescription spending in 2024, and about 1.2 percent of all health care spending [1]. These proportions describe a segment that delivers a large share of savings from a small share of the budget, which is the reason payers cannot afford to run its inclusion decisions loosely.

The forward view sharpens the case. Over the coming decade a large group of biologics will lose exclusivity, which industry analysis frames as a savings opportunity on the order of 234 billion dollars, yet only a small share

of these molecules currently have a biosimilar in development [1]. Whether that opportunity is realized depends in part on whether payers reward the qualities that keep biosimilar markets healthy. Price erosion that runs faster than a supplier can sustain tends to reduce competition over time, and both United States reporting and European procurement analysis link price only selection to consolidation and supply fragility [1, 18]. A weighted model that scores supply resilience alongside price gives payers a way to capture savings today without eroding the competition that produces savings tomorrow.

The mechanics of MCDA are settled in the methodological literature, and the model here follows them while adapting the steps to the off-patent setting. Figure 2 presents the workflow as a sequence of stages with a return path that marks periodic review.

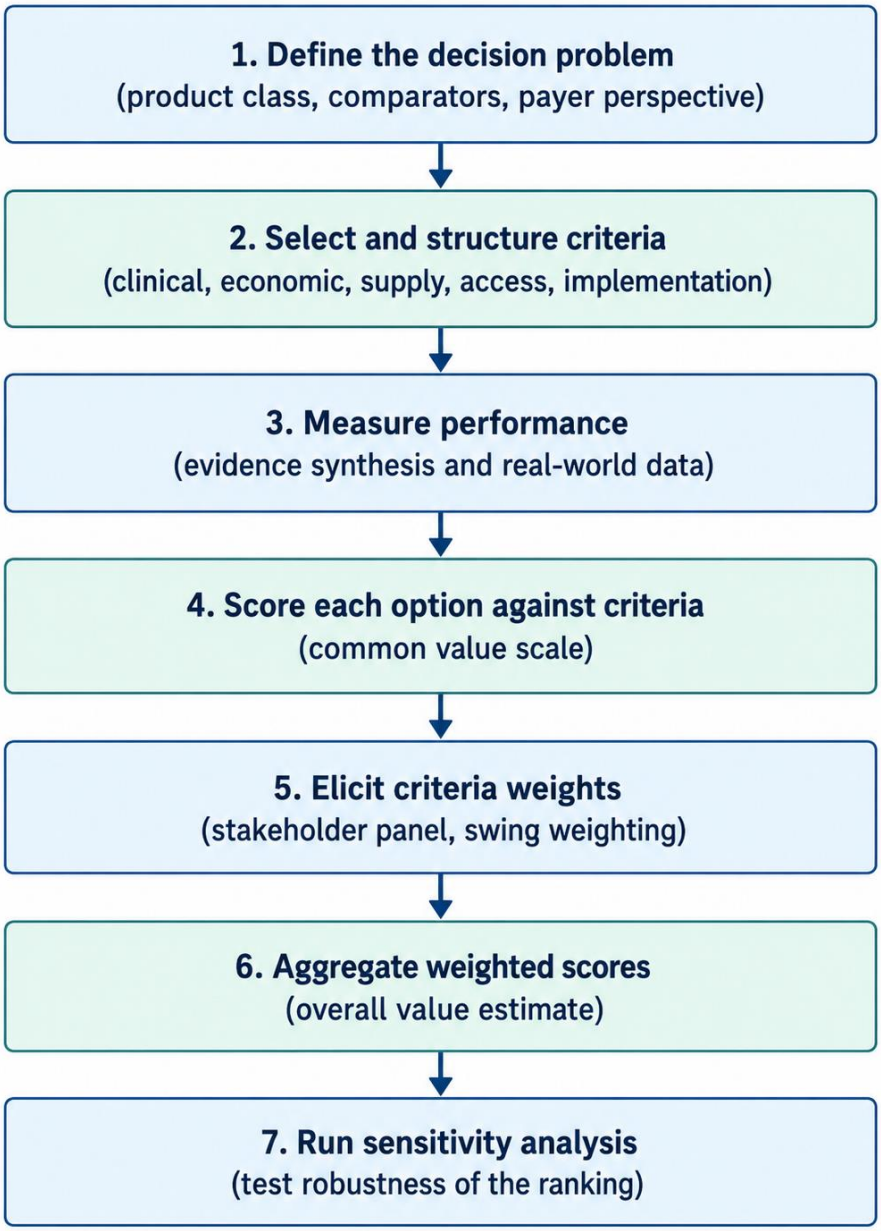

Figure 2. Multicriteria decision analysis workflow adapted for the inclusion of generics and biosimilars in reimbursement systems (compiled by the author based on [4, 5, 6]).

The workflow begins by defining the decision problem, including the product class, the comparators, and the payer perspective, because a decision framed from a health system perspective differs from one framed from a hospital budget perspective [4, 6]. The second step selects and structures the criteria into clusters, which keeps the model readable and reduces double counting. The third and fourth steps measure how each option performs and score that performance on a common scale, drawing on evidence synthesis and, where available, real-world data on uptake and outcomes [17]. The fifth step elicits weights from a stakeholder panel. Swing weighting and simple point allocation are common choices, and the weighting technique should be reported, because different techniques can change the ranking and because the choice of technique is itself a source of variation [8]. The sixth step aggregates the weighted scores into an overall value estimate, and the seventh tests how robust the ranking is to changes in weights and scores. The dashed return path signals that a listing is not permanent; it is revisited as evidence, prices, and the supplier base change.

The aggregation step in Figure 1 uses an additive value model, which is the form most applied MCDA studies in health care adopt [4, 5]. Each option receives a score on each criterion, the scores are placed on a common scale, usually from zero to ten or from zero to one hundred, and each score is multiplied by the weight of its criterion. The weighted scores are summed into an overall value estimate. The additive model is compensatory, meaning a high score on one criterion can offset a low score on another. This property is useful for off patent decisions, because a modest price premium can be offset by stronger supply security, but it also means a committee should set a floor on any criterion that must not be traded away, such as a minimum standard of clinical equivalence, so that the arithmetic does not hide an unacceptable weakness.

Weights are where a committee expresses its priorities, and the technique used to elicit them matters. Swing weighting asks panelists to consider the range of performance on each criterion and to rank the swings from the lowest performance to the highest, which grounds the weight in the actual spread of the options rather than in an abstract sense of importance. Point allocation asks panelists to distribute a fixed number of points across criteria, and the analytic hierarchy process builds weights from pairwise comparisons. A comparison of these techniques found that the choice of method can change the resulting weights and, in turn, the ranking, which is why the method should be reported and, where feasible, tested with more than one technique [8]. In this model the weights in Table 2 are indicative starting values. They are meant to be elicited by each payer panel, and the sensitivity step in the workflow exists precisely to show whether a ranking depends on a contested weight.

Two further choices keep the model honest. First, scoring should draw on documented evidence rather than impression, using evidence synthesis for clinical criteria and, where available, real-world data for uptake and outcomes [17]. Second, the weights and scores should inform a deliberation rather than replace it. The ISPOR guidance frames MCDA as a support for judgment, not a substitute for it, and a committee should be free to depart from the numerical ranking when it can state a reason [5, 6]. Used this way, the model adds structure and traceability without pretending to a false precision.

The center of the model is the criteria set. Drawing on the criteria that appear across applied MCDA studies for off patent and biosimilar decisions, the model organizes value into five clusters. Figure 3 shows the structure as a value tree, which keeps related criteria grouped and makes the model easy to explain to a committee.

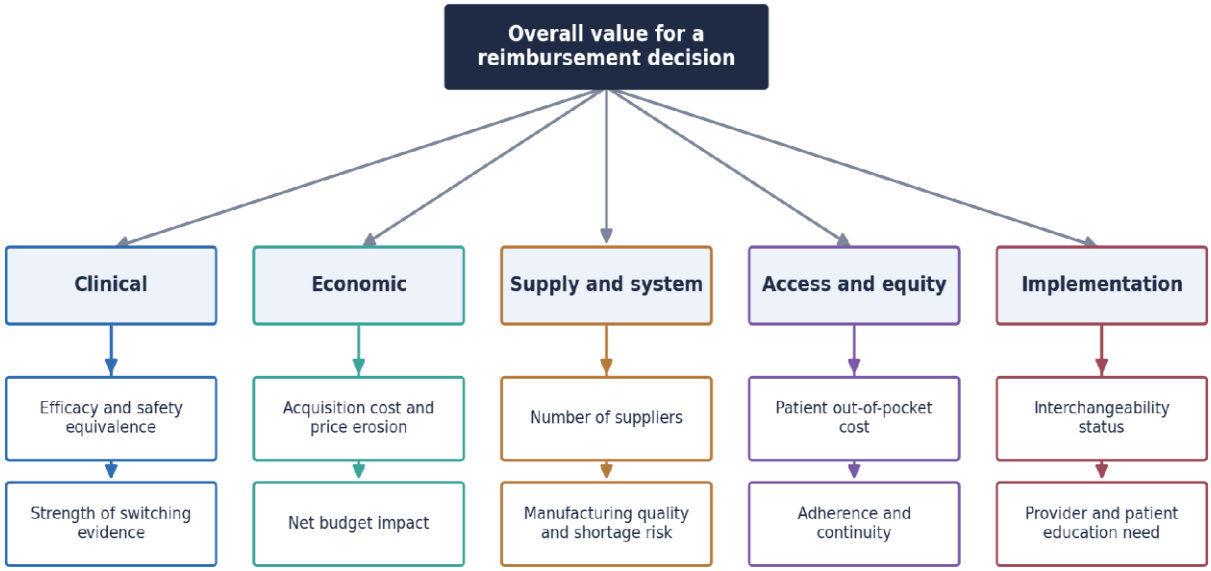

Figure 3. Value tree of criteria for reimbursement inclusion of generics and biosimilars (compiled by the author based on [7, 8, 10, 11, 13]).

The five clusters are clinical, economic, supply and system, access and equity, and implementation. The clinical cluster carries efficacy and safety equivalence and the strength of switching evidence, which matters more for biosimilars than for generics [3, 15]. The economic cluster carries acquisition cost and price erosion together with net budget impact, so that a decision reflects both unit price and the effect on the total budget [16]. The supply and system cluster carries the number of suppliers and manufacturing quality and shortage risk, which is where resilience enters the model [18]. The access and equity cluster carries patient out-of-pocket cost and adherence and continuity of care. The implementation cluster carries interchangeability status and the need for provider and patient education, which recognizes that a listing only delivers value if it is actually used [17]. This structure aligns with value frameworks that combine clinical, economic, and contextual dimensions, and it stays close to the criteria that applied studies report for value-based purchasing of generics and off patent medicines [7, 10, 11].

Figure 3 shows the structure; Table 2 gives each criterion a working definition and an indicative weight, expressed as a range so that a payer can tune the profile for a generic decision or a biosimilar decision. The weights are indicative and were set by the author to reflect where the live risk sits in each decision, and they are meant to be recalibrated by a payer panel using a documented weighting technique [8].

Table 2. Proposed criteria, definitions, and indicative weights for generic and biosimilar inclusion decisions (compiled by the author based on [5, 7, 8, 10, 11]).

Cluster	Criterion	Working definition	Generic weight	Biosimilar weight
Clinical	Efficacy and safety equivalence	Established comparability with the reference product	8	14
Clinical	Strength of switching evidence	Evidence supporting substitution and switching	4	12
Economic	Acquisition cost and price erosion	Unit price and expected discount trajectory	24	16
Economic	Net budget impact	Effect on the total drug budget over the horizon	16	12
Supply and system	Number of suppliers	Breadth of the active supplier base	12	8
Supply and system	Manufacturing quality and shortage risk	Quality record and continuity of supply	12	8
Access and equity	Patient out-of-pocket cost	Direct cost faced by the patient	8	6
Access and equity	Adherence and continuity	Support for uninterrupted treatment	4	6
Implementation	Interchangeability status	Regulatory basis for pharmacy substitution	8	10
Implementation	Education need	Provider and patient information required	4	8
Total			100	100

The difference between the two weight columns is the operational core of the model. For a generic decision, the economic and supply clusters dominate, together carrying 64 of the 100 points, because clinical equivalence is largely settled and the live risks are price and continuity. For a biosimilar decision, weight moves toward the clinical and implementation clusters, which together rise from 24 points to 44 points, because confidence, switching evidence, and education drive whether a listed biosimilar is used. This differential weighting is the specialization that the model contributes. It keeps one coherent structure while letting the profile reflect the real difference between the two product types, and it avoids the two failure modes seen in practice, which are applying an innovative product framework to commodities and applying a commodity price rule to biologics.

To show the model in use, Table 3 applies the biosimilar weight profile to three product archetypes and reports weighted totals. Cluster level weights are used for readability, and scores are on a zero to ten scale for illustration. The archetypes are an interchangeable biosimilar, a non-interchangeable biosimilar, and a multi-source generic, chosen because they span the range of decisions a committee sees.

Table 3. Illustrative weighted scoring of three product archetypes using the biosimilar weight profile (compiled by the author)

Cluster (weight, percent)	Interchangeable biosimilar	Non-interchangeable biosimilar	Multi-source generic
Clinical (26)	9	6	8
Economic (28)	7	7	9
Supply and system (16)	7	6	6
Access and equity (12)	8	6	8
Implementation (18)	9	5	7
Weighted total (out of 10)	8.00	6.10	7.78

The three totals separate the archetypes in a way that price alone would not. The interchangeable biosimilar reaches 8.00, the highest of the three totals, because it combines clinical confidence, a clear substitution basis, and low implementation friction. The multi-source generic follows at 7.78, carried by strong economic and access performance. The non-interchangeable biosimilar trails at 6.10, not because it lacks value, but because weaker switching evidence and a larger education need lower its clinical and implementation scores. A payer reading these totals would not simply reject the third option. It would list it with support such as education and monitoring, which is where the decision zones become useful.

The weighted totals can be read together with two summary dimensions, expected savings and clinical and supply confidence, to place each option in a decision zone. Figure 4 presents this mapping, which converts a number into an action.

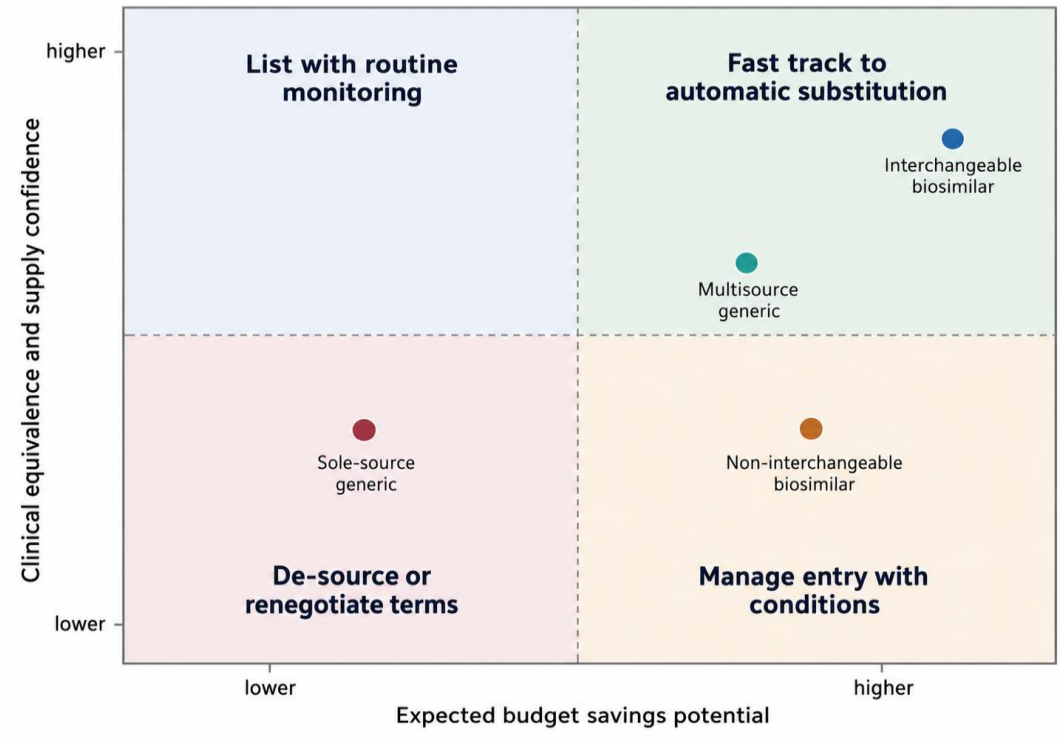

Figure 4. Decision zone map positioning off patent product archetypes by savings potential and clinical and supply confidence (compiled by the author).

The map turns scores into an action. Options in the upper right, with high savings and high confidence, such as an interchangeable biosimilar, move to fast track substitution. Options in the upper left, with lower savings but high confidence, such as a multi-source generic, are listed with routine monitoring. Options in the lower right, with high savings but lower confidence, such as a non-interchangeable biosimilar, enter under managed conditions that pair listing with education and outcome tracking. Options in the lower left, with low savings and low confidence, such as a sole source generic that carries shortage risk, are deferred or renegotiated. The zones are not verdicts. They are starting positions that tell a committee what kind of support a listing needs, which is a more useful output than a single accept or reject.

Three recommendations follow from the model, and together they form a proposal for how off patent inclusion decisions could be run. First, payers should adopt differential weighting as standard, using one criteria structure but two weight profiles, so that generic and biosimilar decisions are handled by the same transparent method without being forced into the same priorities. Second, payers should give supply resilience an explicit, standing weight rather than treating shortages as an afterthought, which aligns the incentive of a listing with the health of the supplier base and supports the sustainability that the biosimilar pipeline needs [1, 18]. Third, players should treat interchangeability status and real-world uptake as scoring criteria that update over time, so that a listing rises or falls as evidence accumulates [3, 17].

The element that this work adds to the field is a supply resilience adjustment built into the aggregation step. In its simplest form, the overall value estimate is multiplied by a resilience factor between about 0.9 and 1.1, set from the number of viable suppliers and the shortage record, so that two products with the same clinical and economic score are separated by their contribution to a stable market. This keeps the arithmetic of MCDA intact while correcting a known weakness of price led selection, and it can be reported and audited like any other part of the model. A payer that applies this adjustment rewards the qualities that keep off patent competition alive, which is the condition for the savings shown in Figure 1 to continue. The adjustment is deliberately small, so that it tunes rather than overturns the value estimate, and its size can be set by policy and disclosed with the decision.

A second addition concerns evidence that arrives after a listing. Because uptake and outcomes for biosimilars are increasingly captured in real-world data, the model treats these as inputs that refresh the clinical and implementation scores on a set schedule [17]. This turns the return path in Figure 1 into a working feedback loop rather than a formality, and it lets a payer raise the score of a biosimilar as clinician confidence grows or lower it if a supply problem appears. The combination of differential weighting, a resilience adjustment, and scheduled evidence refresh is what separates the proposal here from a static scoring sheet.

In the United States, this approach fits the existing decision architecture rather than replacing it. Value assessment in the country already combines clinical effectiveness, cost effectiveness, and contextual considerations within a single judgment [16], and the model here gives formulary committees and pharmacy benefit managers a way to make the off-patent part of that judgment explicit and consistent. Because the method is transparent, it also supports the accountability that public programs require, and it can absorb new evidence on interchangeable biosimilars as the regulatory pathway continues to shorten review times and to widen the pool of substitutable products [3]. The result is a method that is practical for a payer to run and open enough for a stakeholder to check.

Conclusion

This article set out to show how multicriteria decision modeling can structure the inclusion of generic medicines and biosimilars in reimbursement systems, and to organize the relevant value dimensions into a single transparent model that distinguishes the two product types. Those aims are met. The comparative analysis established that the generic decision and the biosimilar decision share a structure but differ in evidence and supply profile. The workflow, the criteria value tree, and the weighted criteria set translated that difference into an operational method, and the worked application and decision zone map showed the method producing rankings and actions that price alone would not. The working hypothesis held within this synthesis. A weighted model with a shifting weight profile, reinforced by a supply resilience adjustment and scheduled evidence refresh, points toward more consistent and more supply resilient listing outcomes than price-led selection.

The practical significance is direct. Formulary committees, Medicare and commercial payers, and health technology assessment analysts gain a shared and auditable method for a class of decisions that carries the majority of prescription volume and a large and growing share of savings. For the United States, where off patent medicines already anchor affordability and where the biosimilar market is still maturing, a method that protects both savings and supply supports a resilient drug supply and the continued growth of competition. Future work should calibrate the criteria weights and the resilience factor with real payer panels and test the model against listing outcomes, which would move it from a structured synthesis toward a validated decision tool.

References

1. Association for Accessible Medicines, & IQVIA Institute. (2025). 2025 U.S. generic and biosimilar medicines savings report. Association for Accessible Medicines. Retrieved from: https://accessiblemeds.org/resources/reports/2025-savings-report/ (date accessed: March 24, 2026).
2. Association for Accessible Medicines, & IQVIA Institute. (2024). 2024 U.S. generic and biosimilar medicines savings report. Association for Accessible Medicines. Retrieved from: https://accessiblemeds.org/resources/reports/2024-savings-report/ (date accessed: April 4, 2026).
3. Samy, P. J., Mouslim, M. C., Bennett, C. L., & Trujillo, A. J. (2026). Regulatory requirements for interchangeable biosimilar designation. Therapeutic Innovation & Regulatory Science, 60, 346–348. https://doi.org/10.1007/s43441-025-00897-6
4. Gongora-Salazar, P., Rocks, S., Fahr, P., Rivero-Arias, O., & Tsiachristas, A. (2023). The use of multicriteria decision analysis to support decision making in healthcare: An updated systematic literature review. Value in Health, 26(5), 780–790. https://doi.org/10.1016/j.jval.2022.11.007
5. Su, P., Zhi, K., Xu, H., Xiao, J., Liu, J., Wang, Z., Liu, Q., Yu, Y., & Dang, H. (2024). The application of multi-criteria decision analysis in evaluating the value of drug-oriented intervention: A literature review. Frontiers in Pharmacology, 15, 1245825. https://doi.org/10.3389/fphar.2024.1245825
6. Barcina Lacosta, T., Inotai, A., Pereira, C. L., Barbier, L., & Simoens, S. (2024). Mapping health technology assessment agency approaches for biosimilar value assessment: An ISPOR Special Interest Group Report. Value in Health, 27(5), 543–551. https://doi.org/10.1016/j.jval.2024.01.018
7. Jakab, I., Németh, B., Elezbawy, B., Karadayi, M. A., Tozan, H., Aydin, S., Shen, J., & Kaló, Z. (2020). Potential criteria for frameworks to support the evaluation of innovative medicines in upper middle-income countries: A systematic literature review on value frameworks and multi-criteria decision analyses. Frontiers in Pharmacology, 11, 1203. https://doi.org/10.3389/fphar.2020.01203
8. Zelei, T., Mendola, N. D., Elezbawy, B., Németh, B., & Campbell, J. D. (2021). Criteria and scoring functions used in multi-criteria decision analysis and value frameworks for the assessment of rare disease therapies: A systematic literature review. PharmacoEconomics - Open, 5(4), 605–612. https://doi.org/10.1007/s41669-021-00271-w
9. Alruthia, Y., Alhajri, H., Almohammed, O. A., Balkhi, B., Alsaqa'aby, M. F., Almuqbil, M. A., Al-Abdulkarim, H. A., & Almutairi, A. R. (2026). Creating a multi-criteria decision analysis tool to enhance value-based purchasing of generic and biosimilar medications in Saudi Arabia: A pilot study. ClinicoEconomics and Outcomes Research, 18, 1–11. https://doi.org/10.2147/CEOR.S568722
10. Farghaly, M. N., Al Dallal, S. A. M., Fasseeh, A. N., Monsef, N. A., Suliman, E. A. M. A., Tahoun, M. A., Abaza, S., & Kaló, Z. (2021). Recommendation for a pilot MCDA tool to support the value-based purchasing of generic medicines in the UAE. Frontiers in Pharmacology, 12, 680737. https://doi.org/10.3389/fphar.2021.680737
11. Elezbawy, B., Fasseeh, A. N., Sedrak, A., Eldessouki, R., Gamal, M., Eldebeiky, M., Amer, H., Akeel, S., Morsy, A., Amin, A., Shafik, A., Abaza, S., & Kaló, Z. (2022). A multi-criteria decision analysis (MCDA) tool for purchasing off-patent oncology medicines in Egypt. Journal of Pharmaceutical Policy and Practice, 15, 10. https://doi.org/10.1186/s40545-022-00414-2
12. Otte, M., Kaló, Z., Al-Omar, H. A., Boysen, M., Chen, Y., Etges, A. P. B. D. S., Kockaya, G., Gutierrez-Ibarluzea, I., Seyam, A. M., Mullen, D., & Dauben, H.-P. (2025). Contextual factors in value-based decision support to enhance health technologies adoption: The case of biosimilars. Frontiers in Pharmacology, 16, 1599013. https://doi.org/10.3389/fphar.2025.1599013
13. Otte, M., Dauben, H.-P., Ahn, J., Gutierrez Ibarluzea, I., Drummond, M., Simoens, S., Kaló, Z.,

& Suh, D. C. (2024). Value based healthcare and health technology assessment for emerging market countries: Joint efforts to overcome barriers. Expert Review of Pharmacoeconomics & Outcomes Research, 24(9), 1061–1066. https://doi.org/10.1080/14737167.2024.2398482

14. Alnaqbi, K. A., Al-jedai, A., Farghaly, M., Omair, M. A., Hamad, A., Abutiban, F. M. A., Al Shirawi, A., Al Rayes, H., Aldallal, S., Fahmy, S., & Simoens, S. (2025). Expert consensus recommendations on a biosimilars value framework for the Gulf Cooperation Council countries. Therapeutic Innovation & Regulatory Science, 59(1), 153–163. https://doi.org/10.1007/s43441-024-00716-4
15. Mulcahy, A., Buttorff, C., Finegold, K., El-Kilani, Z., Oliver, J. F., Murphy, S., & Jessup, A. (2022). Projected US savings from biosimilars, 2021–2025. The American Journal of Managed Care, 28(7), 329–335. https://doi.org/10.37765/ajmc.2022.88809
16. Institute for Clinical and Economic Review. (2023). 2023 value assessment framework. Institute for Clinical and Economic Review. Retrieved from: https://icer.org/our-approach/methods-process/value-assessment-framework/ (date accessed: April 18, 2026).
17. Yang, J., Blinzler, K., Lankin, J., Vijayakumar, S., Maculaitis, M. C., & Shelbaya, A. (2022). Evolving perceptions, utilization, and real-world implementation experiences of oncology monoclonal antibody biosimilars in the USA: Perspectives from both payers and physicians. BioDrugs, 36(1), 71–83. https://doi.org/10.1007/s40259-021-00509-3
18. IQVIA Institute for Human Data Science. (2026). Biosimilar sustainability scorecards for Europe 2026. IQVIA Institute for Human Data Science. Retrieved from: https://www.iqvia.com/insights/the-iqvia-institute/reports-and-publications/reports/biosimilar-sustainability-scorecards-for-europe-2026 (date accessed: June 14, 2026).
19. Metelkin, I. A., Yagudina, R. I., & Kulikov, A. Yu. (2012). Methodology of cost-effectiveness analysis in pharmacoeconomic research. Pharmacoeconomics: Modern Pharmacoeconomics and Epidemiology, (4), 3-8.
20. Metelkin, I. A., Yagudina, R. I., Kulikov, A. Yu., & Serpik, V. G. (2013). Pharmacoeconomic analysis of nutritional support in hospitalized patients. In Parenteral and enteral nutrition: National guidelines (pp. 77-92). Moscow.