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Regulation, Reimbursement, and Economic Access: A Health Policy Perspective on Dupilumab in Different Countries' Health Systems

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Abstract. Dupilumab, the first biologic therapy targeting the IL-4 and IL-13 signaling pathways, offers a novel treatment option for patients with moderate-to-severe atopic dermatitis. Despite its demonstrated clinical effectiveness, access to Dupilumab remains uneven across countries, largely due to divergent regulatory approval processes, pricing frameworks, and reimbursement strategies. This study conducts a comparative analysis of the approval timelines, pricing structures, and reimbursement mechanisms in United States, European Union, Japan, and China. In the U.S., expedited pathways such as Breakthrough Therapy Designation facilitate rapid market entry, but the absence of universal healthcare often results in substantial financial barriers for patients. In contract, the EU and Japan implement centralized health technology assessment (HTA) processes and national insurance systems that enable more standardized and equitable access. China's recent inclusion of Dupilumab in the National Reimbursement Drug List (NRDL) has significantly reduced cost and improved access, through provincial disparities persist. Drawing from these international experiences, this paper offers policy insights for emerging markets seeking to enhance timely and affordable access to high-cost innovative therapies.

Keywords: Health Policy, Dupilumab, Economic Access, Atopic Dermatitis

1. Introduction

Atopic dermatitis (AD), also known as atopic eczema, is a chronic inflammatory skin condition that severely impacts quality of life, causing sleep disturbances, psychological stress, and long-term healthcare needs [1]. Globally, AD affects over 200 million people, with prevalence rising in the U.S., Europe, and Japan [2]. Dupilumab, a monoclonal antibody targeting IL-4 and IL-13 pathways, represents the first-in-class biologic therapy approved for moderate-to-severe AD [3-5]. Approved in the U.S. and EU in 2017, Japan in 2019, and China between 2020 and 2022, Dupilumab has demonstrated significant efficacy in reducing flare-ups and improving long-term outcomes [6-8].

However, high drug prices and diverse reimbursement policies create major disparities in patient access across countries. While clinical trials have confirmed Dupilumab's efficacy and safety, limited attention has been paid to the health policy mechanisms shaping its availability. This study addresses that gap by comparing regulatory approval and reimbursement pathways in the United

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States, European Union, Japan, and China. By evaluating these distinct healthcare systems, this analysis seeks to extract lessons that may inform policy strategies in China to accelerate equitable access to innovative therapies.

2. Background and economic context

Despite its clinical effectiveness, Dupilumab's high cost poses a significant barrier to access [9]. In the U.S., the estimated lifetime treatment cost for AD patients receiving Dupilumab is approximately $509,600, with $267,800 attributed directly to the drug and the remainder to other healthcare expenses [10]. Dupilumab has been shown to provide an additional 1.91 quality-adjusted life years (QALYs), resulting in an incremental cost-effectiveness ratio (ICER) of $124,500 per QALY—close to the commonly accepted U.S. threshold of $100,000–150,000 per QALY [10].

In Japan, Dupilumab has been evaluated in the context of severe asthma treatment, where its ICER was found to be below ¥5 million (~$45,000), consistent with Japan's national HTA thresholds [11]. These findings highlight the critical role of economic evaluation tools such as ICER and QALY in informing national payer decisions and balancing innovation with affordability.

While the U.S.'s fragmented pricing system results in inconsistent coverage and high out-of-pocket costs, centralized HTA frameworks in Japan and Korea enable more rapid reimbursement and equitable access. Integrating cost-utility analysis into national decision-making helps ensure public resources are allocated efficiently, without compromising financial sustainability. For China, understanding these diverse economic evaluation models provides valuable insights to optimize drug pricing and reimbursement policies for high-cost biologics like Dupilumab.

3. Regulatory approval pathways

3.1. United States (FDA)

In March 2017, the U.S. Food and Drug Administration (FDA) approved Dupilumab under its Breakthrough Therapy, Fast Track, and Priority Review designations [5]. These expedited pathways enabled a total review period of less than nine months, allowing rapid market access for patients with moderate-to-severe AD. The U.S. regulatory system prioritizes speed, particularly for therapies addressing significant unmet clinical needs.

3.2. European Union (EMA)

Within the EU, Dupilumab received centralized approval via the European Medicines Agency (EMA) in September 2017. Benefiting from the Accelerated Assessment process, total review time was reduced to approximately 210 days [7]. The centralized procedure allowed a single marketing authorization to be valid across all member states, ensuring broad regional access soon after approval.

3.3. Japan (PMDA)

Japan's Pharmaceuticals and Medical Devices Agency (PMDA) approved Dupilumab in 2019. Nevertheless, Japan mandates local clinical trials to confirm efficacy and safety in domestic populations [12]. Notably, reimbursement and approval are closely linked within Japan's NHI system, enabling relatively rapid patient access post-approval.

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3.4. China (NMPA + NHSA)

In 2020, China's National Medical Products Administration (NMPA) granted priority review and approval for Dupilumab, recognizing it as an urgent overseas therapy. Pediatric indications were approved in 2022 [8]. Reimbursement, however, is governed by the National Healthcare Security Administration (NHSA) via national negotiations and provincial-level implementation. This dual structure leads to significant variation in patient access across regions.

4. Reimbursement and economic accessibility

4.1. Pricing and payer systems

In the U.S., both private and public insurers coexist, with private payers playing a dominant role [13]. Although Dupilumab is widely covered through programs such as Medicaid, Medicare, and private insurers, its list price remains over $37,000 annually [10]. Among the 37.4% of atopic dermatitis (AD) patients who did not initiate Dupilumab treatment, approximately 19% cited insurance denial as the reason. Patients enrolled in Medicare were less likely to receive treatment compared to those covered by commercial insurance or Medicaid [14].

In Europe and Japan, HTA-based price negotiation is implemented. The health technology assessment (HTA) framework adopts a systematic and multidisciplinary approach, evaluating not only clinical effectiveness but also organizational, social, and ethical dimensions [15]. In Germany and France, HTA agencies assess the added clinical benefit of Dupilumab and negotiate prices accordingly [7]. In Japan, Dupilumab was added to the National Health Insurance (NHI) drug list soon after approval, with regulated pricing and minimal copayments for most citizens [12].

In China, following regulatory approval in 2020, Dupilumab was included in the National Reimbursement Drug List (NRDL) in 2022 after major price negotiations. This significantly reduced the cost from approximately $3,000/month to around $900/month. However, access remains uneven due to variations in provincial-level policy implementation, local budgets, hospital formularies, and insurance coverage tiers [8]. Reimbursement rates typically range from 50% to 70%, varying by province.

4.2. Time from approval to access

Timeline The timeline from regulatory approval to patient access for Dupilumab varies significantly across countries, reflecting differences in healthcare system structures and reimbursement mechanisms. In March 2017, Dupilumab received its first global approval in the USA [5]. The combined process of regulatory approval and insurance coverage typically takes 3 to 6 months.

In the EU, subsequent national HTA assessments and reimbursement negotiations extend the timeline to approximately 6 to 9 months. In Japan, after regulatory approval, the drug is generally listed on the NHI formulary within about 6 months, enabling rapid access through insurance coverage. In China, the gap between NMPA approval (2020) and NRDL inclusion (2022), coupled with local administrative delays, extends the timeline for real-world patient access [8].

4.3. Patient out-of-pocket burden

The financial burden of Dupilumab treatment varies substantially across healthcare systems due to differences in insurance coverage and copayment policies. In the U.S., out-of-pocket costs depend heavily on insurance type, with low-income populations more likely to rely on public insurance

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programs that often feature narrower formularies and higher copayments, limiting their access to Dupilumab.

In Japan and many EU countries, strict price controls and comprehensive public insurance schemes minimize patient payments, effectively preventing significant out-of-pocket burdens. In China, reimbursement rates and out-of-pocket expenses vary between urban and rural areas, reflecting disparities in local health insurance funds and administrative capacities. Consequently, affordability remains a significant challenge for many patients in less developed regions.

5. Discussion

Overall, the regulatory and reimbursement pathways of Dupilumab reflect different national priorities—speed, safety, equity, and cost control.

In the United States, the FDA's accelerated approval pathways allowed Dupilumab to reach the market within just nine months [6]. However, the absence of universal healthcare and reliance on private insurance result in significant disparities, with many low-income patients facing coverage denials or high out-of-pocket costs.

In contrast, the European Union employs centralized approval and HTA-based reimbursement frameworks, ensuring affordability and equity across member states [7]. While the approval process is slightly slower, universal public insurance and government-negotiated pricing enable broad access with minimal financial burden.

Japan mandates local clinical trials even for globally approved drugs [12]. While this delays market entry, it ensures safety through population-specific data—a strategy that could be adapted in China to enhance local safety assurance. Once approved, Dupilumab was rapidly incorporated into Japan's National Health Insurance drug list, ensuring equitable public access.

In China, Dupilumab was approved in 2020, with reimbursement inclusion delayed until 2022 [8]. Although national price negotiations significantly reduced costs, access remains uneven due to provincial disparities in policy implementation. Establishing a nationwide digital platform to track reimbursement updates and report access barriers could help standardize availability and equity.

South Korea offers noteworthy policy innovations, such as conditional reimbursement, which allows temporary coverage of high-cost therapies while monitoring real-world effectiveness [16]. Its phased reimbursement approach enables partial payment during early market entry, balancing timely treatment access with post-market evaluation. Such strategies may be valuable for China's future policy development.

6. Conclusion

The case of Dupilumab underscores the complex interplay between medical innovation, cost containment, and equitable access within national healthcare systems. Countries employing centralized HTA and pricing mechanisms—such as the EU and Japan—demonstrate more consistent and affordable access to advanced therapies. By contrast, the U.S. prioritizes rapid approval, but its fragmented and unequal insurance system results in marked disparities in access and affordability. China has made meaningful progress through national price negotiations and the drug's inclusion in the NRDL; however, variability in provincial implementation continues to pose challenges. Moving forward, emerging healthcare systems can benefit from adopting international strategies, including conditional reimbursement models, robust cost-utility frameworks, and post-market real-world evidence collection. Policymakers should prioritize transparent price negotiations, digital

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reimbursement platforms, and outcome-based evaluation tools to ensure timely, equitable, and financially sustainable access to high-cost biologics like Dupilumab.

References

[1] Berke R, Singh A, Guralnick M. Atopic dermatitis: an overview. Am Fam Physician. 2012; 86(1): 35–42. Available from: https: //www.aafp.org/afp/2012/0701/p35.html

[2] Spergel JM, Paller AS. Atopic dermatitis and the atopic march. J Allergy Clin Immunol. 2003; 112(6 Suppl): S118–S127. Available from: https: //www.sciencedirect.com/science/article/pii/S0091674903023704

[3] Seegräber M, Srour J, Walter A, Knop M, Wollenberg A. Dupilumab for treatment of atopic dermatitis. Expert Rev Clin Pharmacol. 2018; 11(5): 467–474. doi: 10.1080/17512433.2018.1449642.

[4] Gu C, Wu Y, Luo Y, Wang S, Yin H, Gao Y, Wang C, Yao X, Li W. Realworld efficacy and safety of dupilumab in Chinese patients with atopic dermatitis: a singlecentre, prospective, openlabel study. J Eur Acad Dermatol Venereol. 2022; 36(7): 1064–1073. doi: 10.1111/jdv.18109

[5] Shirley M. Dupilumab: first global approval. Drugs. 2017; 77(10): 1115–1121. doi: 10.1007/S40265-017-0768-3.

[6] Stewart J. Dupixent (dupilumab) FDA approval history and expanded indications. Drugs.com. Last updated June 23, 2025. Available from: https: //www.drugs.com/history/dupixent.html

[7] European Medicines Agency. Dupixent (dupilumab): EPAR – Public assessment report. First published October 11, 2017; last updated April 9, 2024. Available from: https: //www.ema.europa.eu/en/medicines/human/EPAR/dupixent

[8] Regeneron Pharmaceuticals, Inc., and Sanofi. Dupixent (dupilumab) approved in China for adults with moderate-to-severe atopic dermatitis. PR Newswire. June 19, 2020. Available from: https: //www.prnewswire.com/news-releases/dupixent-dupilumab-approved-in-china-for-adults-with-moderate-to-severe-atopic-dermatitis-301080239.html

[9] Wang CY, Zheng RRC, Doerrer ZA, Kurta AO, Shelley JJ, Siegfried EC. Health care regulation, the Food and Drug Administration (FDA), and access to medicine: our experience with dupilumab for children. J Am Acad Dermatol. 2020; 82(6): 1568–1569. doi: 10.1016/j.jaad.2020.01.019

[10] Zimmermann MA, Rind D, Chapman R, Kumar V, Kahn S, Carlson J. Economic evaluation of Dupilumab for moderate-to-severe atopic dermatitis: a cost-utility analysis. J Drugs Dermatol. 2018; 17(7): 750–756. PMID: 30005097

[11] Oh SH, Rhee CK, Bae EJ, Ku H. Cost-effectiveness analysis of dupilumab among patients with uncontrolled severe asthma using LIBERTY ASTHMA QUEST Korean data. Health Econ Rev. 2024; 14: 67. doi: 10.1186/s13561-024-00532-4Available from: https: //healtheconomicsreview.biomedcentral.com/articles/10.1186/s13561-024-00532-4

[12] Tohda Y, Matsumoto H, Miyata M, et al. Cost-effectiveness of dupilumab in Japan for asthma. PharmacoEconomics. 2020; 38(12): 1225–1235. DOI: 10.1080/02770903.2021.1996596

[13] Chua K-P. Overview of the U.S. health care system. AMSA Jack Rutledge Fellowship Report. February 10, 2006. Available from: https: //www.meddean.luc.edu/lumen/meded/ipm/ipm3/bpandj/healthcaresystemoverview-amsa%2020062_25_09.pdf

[14] Khosravi H, Zhang S, Anderson AM, Ferris LK, Choudhary S, Patton T. Dupilumab drug survival, treatment failures, and insurance approval at a tertiary care center in the United States. J Am Acad Dermatol. 2020 Apr; 82(4): 1023–1024. doi: 10.1016/j.jaad.2019.12.034

[15] La Mantia I, Ottaviano G, Ragusa M, Trimarchi M, Foglia E, Schettini F, Bellavia D, Cantone E. Multidimensional impact of dupilumab on chronic rhinosinusitis with nasal polyps: a complete health technology assessment of clinical, economic, and non-clinical domains. J Pers Med. 2024; 14(4): 347. doi: 10.3390/jpm14040347

[16] Kim H, Godman B, Kwon HY, Hong SH. Introduction of managed entry agreements in Korea: Problem, policy, and politics. Front Pharmacol. 2023; 14: 999220. doi: 10.3389/fphar.2023.999220