Dissertation Report PPT

Title: A Study on the Success of Biosimilars and Biologics for the Treatment of Ankylosing Spondylitis and the factors behind Market Share Shift from leading products

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Abstract:

This dissertation examines the success of biosimilars and biologics in the treatment of Ankylosing Spondylitis (AS) and explores the factors behind the market share shift from leading products. AS is a chronic autoimmune disease characterized by spinal and joint inflammation. While biologics have proven effective in managing AS, their high cost often limits accessibility. Biosimilars have emerged as more affordable alternatives, but understanding the drivers of market share shift is crucial for policymakers, payers, and manufacturers. This objective study aims to promote the appropriate use of biosimilars for AS treatment, ensuring affordability and patient efficacy.

The study contributes to the understanding of the success of biosimilars and biologics in AS treatment and sheds light on the factors driving market share shift. It emphasizes the importance of appropriate biosimilar usage to ensure patient access to effective and affordable treatments. The insights provided can inform policymakers, payers, and manufacturers in making informed decisions to improve AS treatment outcomes

Aim:

The aim of the study is to:

1. Investigate the success of biosimilars and biologics in the treatment of Ankylosing Spondylitis (AS).
2. Investigate the factors behind the market share shift from leading products.
3. Identify the drivers of success and barriers to the uptake of biosimilars, and provide insights for policymakers, payers, and manufacturers to promote the appropriate use of biosimilars and improve patient access to effective and affordable treatments for AS.

Methodology:

Type of Research
Qualitative research design

Study Design
Observational descriptive study design

Data Collection method:
Secondary research (Review of existing literature, research articles, reports, and relevant documents

Data analysis plan:
Descriptive analysis and content analysis

Literature Review: Overview

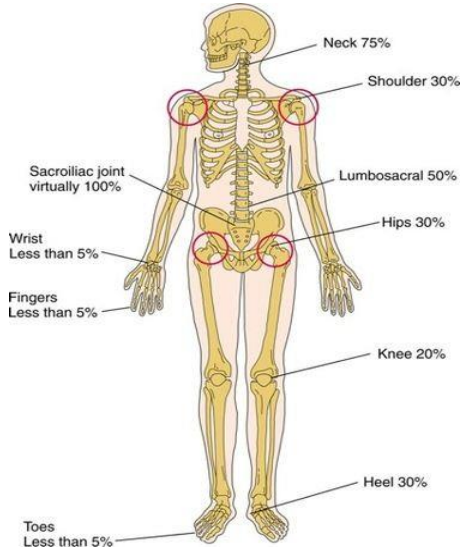
Ankylosing spondylitis, also known as 'Axial Spondyloarthritis', is an inflammatory disease that, over time, can cause some of the bones in the spine, called vertebrae, to fuse. This fusing makes the spine less flexible and can result in a hunched posture.
People who have a gene called **HLA-B27** are at a greatly increased risk of developing ankylosing spondylitis.

Normal Spine | Inflammation of joints | Fusion of bones

Symptoms:
AS is characterized by pain and stiffness in the back and neck, which can gradually worsen over time and lead to fusion of the affected joints.

The areas most affected are:

i. The joint between the base of the spine and the pelvis.
ii. The vertebrae in the lower back.
iii. Tendons and ligaments attach to bones in the spine and heel. The cartilage between the breastbone and the ribs.
iv. The hip and shoulder joints.



Types

I. Classic or axial AS: This is the most common form of AS, which affects the axial skeleton, including the spine, pelvis, and sacroiliac joints.

II. Peripheral AS: This form of AS affects the peripheral joints, such as the knees, hips, shoulders, and small joints of the hands and feet.

Epidemiology of Ankylosing Spondylitis

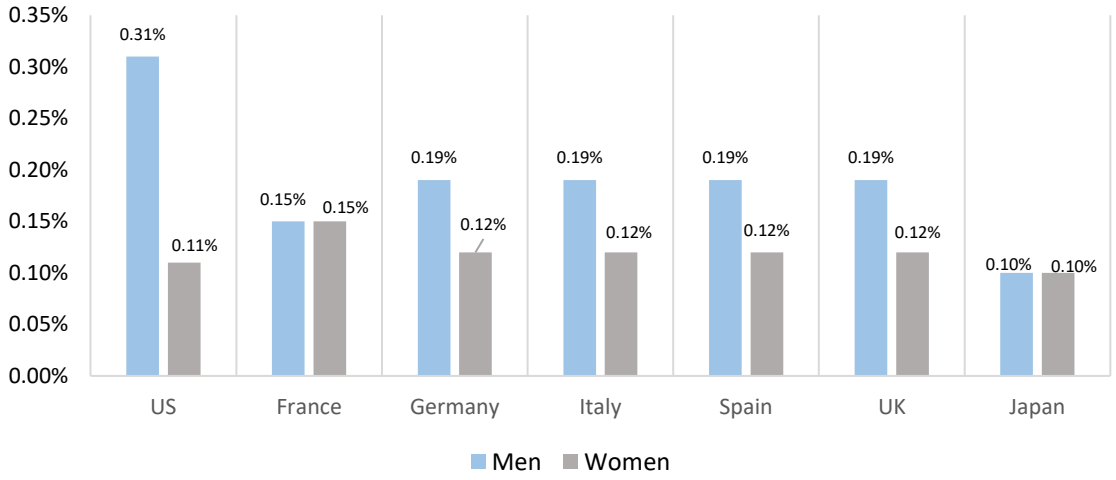
The onset of AS starts before **40 years,** with **80%** experiencing first symptoms before **30**.

AS is more common among **men than women.** There is an increased risk in relatives of affected patients.

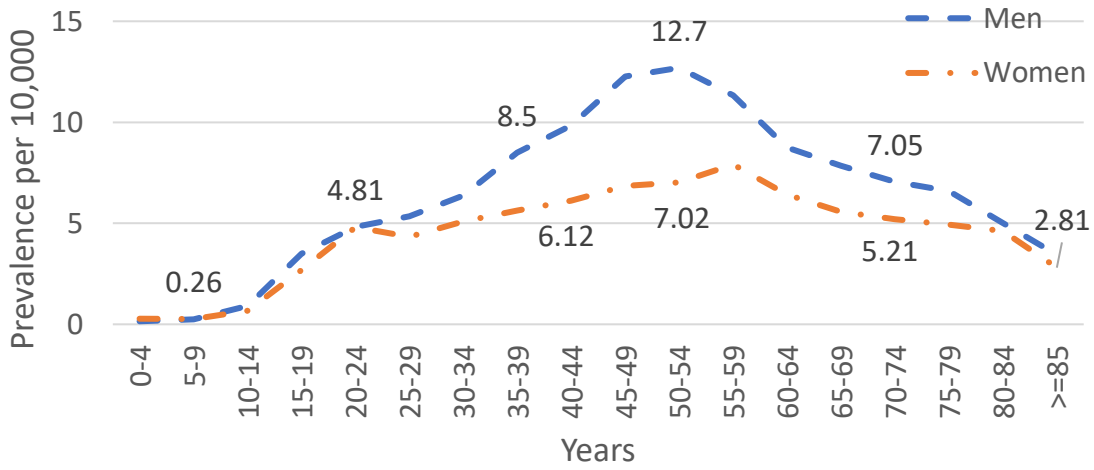
Recent population estimates indicate that the prevalence of AS in the United States is approximately **0.2-0.5%.**

Based on data from multiple countries, the age- and sex-adjusted incidence of AS is **0.4-14** per **100,000** person-years.

Prevalence of AS in different countries (Segmented by gender)



Prevalence of AS in different age groups

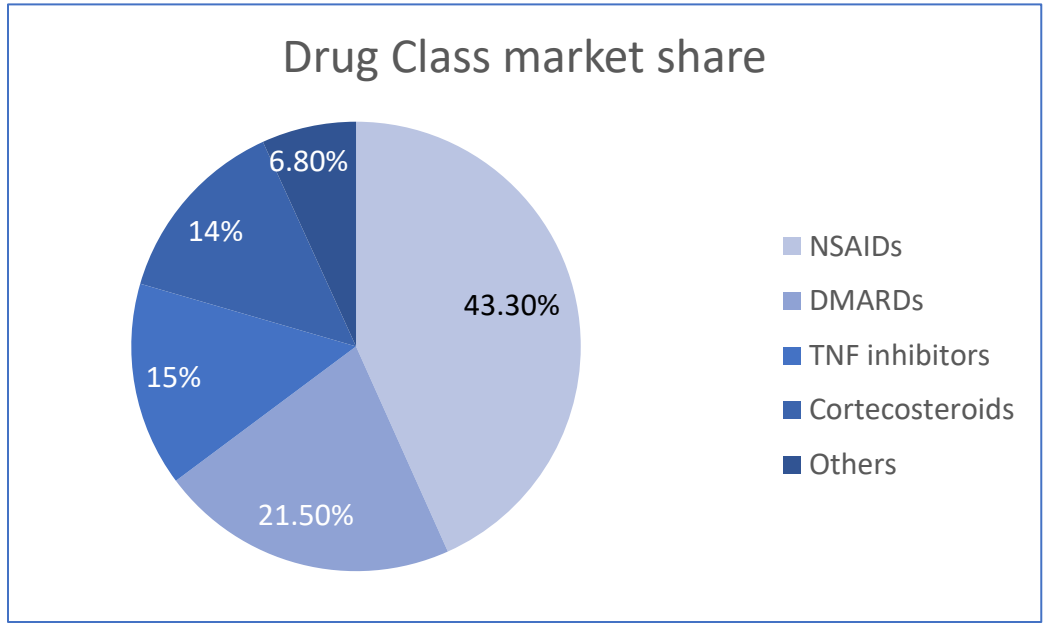


Key Market Players : US based companies are dominating the market

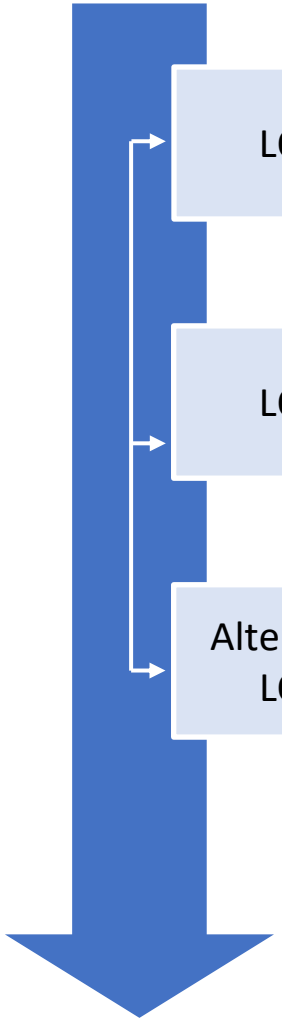
Company	HQ	Product
Abbivie	Illinois, US	HUMIRA
Novartis	Basel, Switzerland	COSENTYX
Amgen	California, US	ENBREL
Eli Lilli	Indiana, US	Talz
Gilead Sciences	California, US	Filgotinib
Janssen	Bersse, Belgium	Simponi, Remicade
Pfizer	New York, US	XELJANZ
UCB	Brussels, Belgium	Cimzia

AS market is valued at **$5.14 billion** in 2021

Projected CAGR of **6%** from 2021 to 2030



Treatment Algorithm: Around 40% of As diagnosed patients are prescribed for biological drugs



LOT 1

Nonsteroidal anti-inflammatory drugs (NSAIDs) — such as Naproxen Sodium (Aleve) and Ibuprofen (Advil, Motrin IB, others) — are the medicines health care providers most used.
These medicines can relieve inflammation, pain and stiffness, but they also might cause gastrointestinal bleeding.

LOT 2

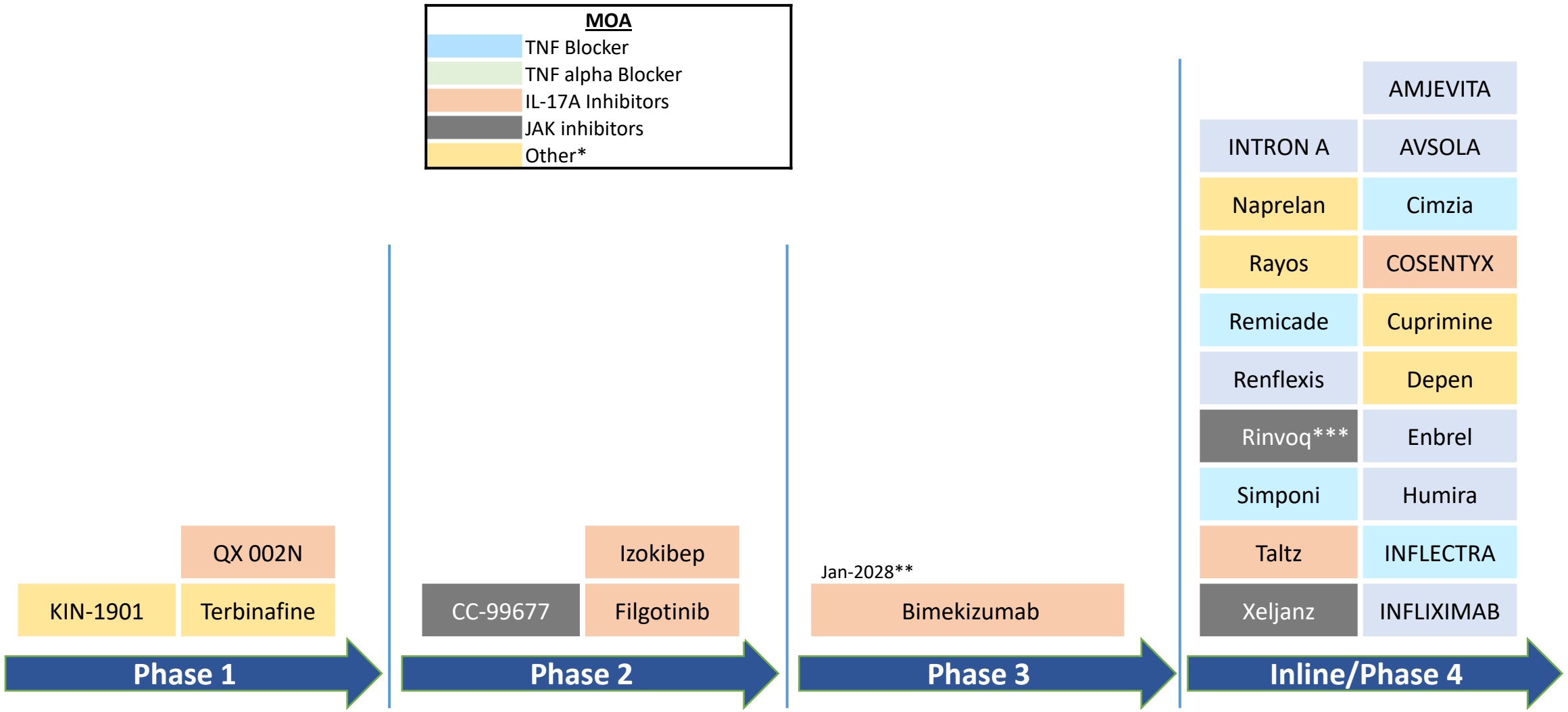
Tumor necrosis factor (TNF) blocker or Interleukin-17 (IL-17) inhibitor is given when NSAIDs stops working
Examples of **TNF blockers** : Adalimumab (Humira),Certolizumab pegol (Cimzia),Etanercept (Enbrel),Golimumab (Simponi),Infliximab (Remicade).
Examples of **IL-17 inhibitors** : Secukinumab (Cosentyx) and Ixekizumab (Taltz).

Alternates/ LOT 3

Janus kinase (JAK) inhibitor- JAK inhibitors are taken by mouth. E.g. - Tofacitinib (Xeljanz) and Upadacitinib (Rinvoq).
Surgery: Surgery may be recommended if you have severe pain or if a hip joint is so damaged that it needs to be replaced.

In a study of cohort size of **14,789** AS diagnosed patient it was found that biologics were the most commonly used medication for AS, accounting for 39.3% of cases. Usage was higher in males (43.2%) compared to females (35.0%).

Pipeline and Inline Drugs for Ankylosing Spondylitis



*Others include – NSAIDs,PENICILLAMINE, Cortecosteroids, Granulocyte stimulating factor antagonists
** Expected launch date
***Clinical trial going on for additional label

Interpretations:

Clinical investigations have shown that TNF inhibitors (TNFi's) have significant benefits in reducing symptoms, CRP levels, and inflammation in the spine or sacroiliac joints (SIJs) as detected in MRI.

TNFi treatment has demonstrated high response rates, with AS20 and AS40 response rates ranging from 57% to 64% and **40% to 50%,** respectively, compared to lower response rates in placebo groups.

TNFi treatment has shown a long-term response rate of **82%** for AS20 responders after five years.

•IL-17 inhibitors, including Secukinumab and Ixekizumab, have demonstrated effectiveness in treating Ankylosing Spondylitis (AS) patients, with positive ASAS40 response rates.

•Secukinumab has shown sustained response and reduced spinal inflammation in long-term studies, suggesting its potential as a long-term treatment option. Additionally, IL-17 inhibition, including Secukinumab, may slow down the progression of radiographic changes in AS.

•In terms of market penetration, Adalimumab is the most commonly used TNF inhibitor (TNFi) for AS, followed by etanercept and Infliximab. Biosimilars such as Infliximab-dyyb have gained popularity as more affordable alternatives to biologic drugs.

•Treatment patterns in AS have shown an increasing usage of TNFi, oral corticosteroids, nonsteroidal anti-inflammatory drugs (NSAIDs), and non-biological disease-modifying antirheumatic drugs (DMARDs) over the past decade.

•TNFi emerged as the most frequently prescribed medication for AS, followed by NSAIDs. Opioids were also commonly used in AS treatment.

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The Factors behind the Success of Biologics and Biosimiars

Targeted therapy
This leads to better symptom control and potentially slower disease progression by treating the underlying cause of inflammation.

Research and development
Biologic and biosimilar success in AS has spurred research for new therapies and targets, leading to improved treatment options.

Biologics/Biosimilars Offer Improved Symptom Control, Quality of Life, and Disease Progression for Ankylosing Spondylitis Patients

Improved efficacy
Biologics and biosimilars are more effective in reducing AS signs and symptoms than conventional drugs like NSAIDs and DMARDs, as demonstrated by clinical trials.

Reduced side effects
Biologics and biosimilars have fewer side effects than conventional drugs .This improves tolerability and adherence

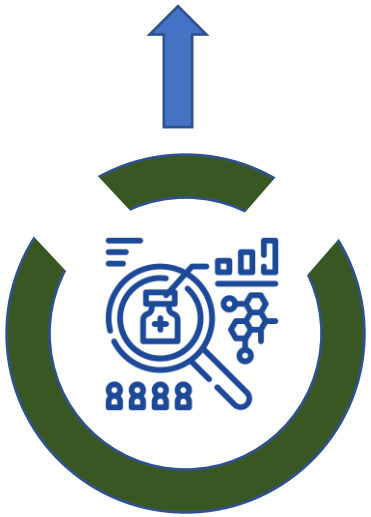
Cost-effectiveness
Biosimilars are similar to biologics but less expensive. This access to effective treatments, leading to better symptom management and improved quality of life.

Personalized medicine
Biologics and biosimilars can be personalized to target specific inflammatory proteins or cells resulting in better outcome.

Unmet Needs in the treatment of Ankylosing Spondylitis

Improved patient education, better access to care, and increased effectiveness of available treatments

More research is needed to determine their long-term safety and efficacy **TNFi** and **Interleukin-17A inhibitors**



Further investigation into **alternative treatment** options for patients who do not respond to these therapies

Ankylosing Spondylitis is often misdiagnosed or diagnosed too late, leading to delayed treatment and a longer gap between symptom onset and diagnosis.

There is also a need for more reliable biomarkers for ankylosing spondylitis, like those currently available that lack sensitivity and specificity.

Biosimilars: On track to reduce U.S. drug expenditure by $133 billion

- In a recent survey, it was found that **86% of gastroenterologists** and **62% of rheumatologists** reported being **"very comfortable"** prescribing biosimilars to their patients.
- However, the survey revealed that only **35% of dermatologists** expressed the same level of comfort.
- Interestingly**, 56% of ophthalmologists** stated their **willingness to prescribe biosimilars**, but with the condition that the biosimilar had achieved the FDA **interchangeability designation**.

1. Cost Effectiveness

Biosimilars, being cheaper than their reference biologics like Humira, are more appealing to healthcare systems, insurers, and patients, resulting in higher adoption and market share.

2. Similar efficacy and safety

Biosimilars meet stringent standards for efficacy and safety, making them a reliable alternative to reference biologics.

3. Increased awareness and acceptance:

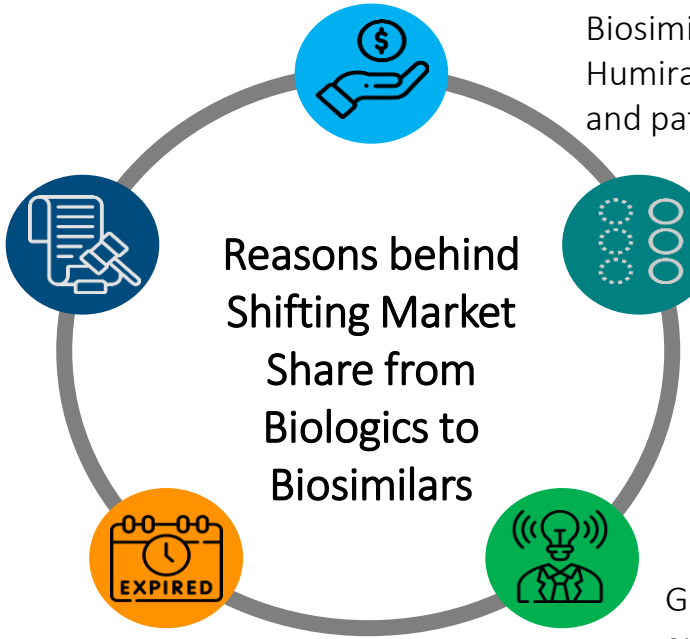
Growing familiarity and acceptance of biosimilars among healthcare providers, patients, and regulatory agencies have boosted their market share.

4. Patent expiration

Expired patents for Humira have enabled biosimilar manufacturers to enter the market, resulting in a shift in market share.

5.Payer and government incentives

Policies and incentives in certain countries promote biosimilar use, boosting their market share over reference biologics.



Why Biosimilars failed to meet market expectations in US

It was predicted that biosimilars would lead to **$13 billion** in savings to the US healthcare system over 10 years.

Payers expected biosimilars to come in at discounts of **30% to 40%,** and they anticipated **21%-30%** cost savings for starting new patients on biosimilars versus switching patients from a reference product to a biosimilar.

Over time, payers anticipated discounts of just **10% to 20%** from reference biologics.

The Patent Thicket challenge

1. Companies extend the exclusivity period through lawsuits and filing numerous patents.
2. Abbvie, has filed over 200 patents and patent applications that cover the drug itself, manufacturing methods and other ancillary aspects associated with its use.
3. Humira's price has increased 18% each year, rising from $16,000 to over $30,000 from 2012 to 2016 alone.

The Rebate Trap

1. Drug manufacturers, Pharmacy Benefit Managers (PBMs) and other payers that create incentives for listing higher-priced originator biologics over biosimilars on formularies.
2. Since the retail price of biosimilars is only modestly lower than originator biologics
3. Rebates may result in biologics having a lower post-rebate price than biosimilars.

Prescriber inertia

1. Underwhelming cost savings hinder biosimilar adoption.
2. Clinicians are often influenced by Formulary Inconsistencies
3. Higher drug prices results in higher reimbursement amounts.
4. Switching to biosimilars can result in unreimbursed work for physicians.
5. Physician knowledge about biosimilars is lacking, with many doctors unfamiliar with these drugs.

Interchangeability

1. U.S. biosimilar regulations took time due to healthcare system complexity and biologic drug characteristics.
2. FDA requires safety/efficacy data for switching to biosimilars and extrapolation to other indications.
3. Interchangeability, indicating identical results, requires additional data and FDA guidance, impacting biosimilar adoption speed.

Conclusion

Overview of the Biologic Market

- Biologics have revolutionized the treatment of various diseases, including cancer, autoimmune disorders, and chronic inflammatory conditions.
- The biologic market is a significant and rapidly expanding sector of the pharmaceutical industry.
- Biologics account for over a quarter of pharmaceutical spending, attracting increasing attention from payers.
- The market is expected to continue expanding due to ongoing research and development efforts.

Challenges in Biosimilar launch

- Biosimilars have been able to attain market shares ranging from **20% to over 50%** within a few years of launch.
- Challenges in developing biosimilars include:

i. Cost
ii. Development time
iii. Competition
iv. Legal challenges
v. Interchangeability
vi. Acceptance market entry (adoption)

- Collaboration is key to a successful and sustainable biosimilar market, involving regulators, manufacturers, healthcare providers, patient advocates, and payers.

Strategies for Successful Biosimilar Launch

- Developing a well-planned launch strategy well in advance of the actual launch date.
- Engaging healthcare providers in extensive and comprehensive education before product launch.
- Utilizing available advocacy efforts to support and promote biosimilars.
- Continued efforts are necessary to enhance the acceptance of biosimilars in the US market and achieve the anticipated cost savings to the healthcare system through wider adoption.

THANK YOU