February 2007

Potential Savings Of Biogenerics In the United States

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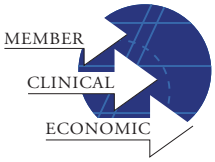

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Executive Summary

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Potential Savings of Biogenerics in the United States

This study calculated the potential savings to the U.S. healthcare system that could be realized if the Food and Drug Administration (FDA) were to develop a pathway for evaluation and approval of generic biologic medications or biogenerics. Using data from Express Scripts *2005 Drug Trend Report* and IMS, Express Scripts modeled the savings opportunity in four therapeutic categories of biologic medication use: interferons for multiple sclerosis, erythropoietin for anemia, growth hormone for growth failure, and insulin for diabetes. Total estimated savings over a 10-year period was approximately $71 billion. The unrealized savings are significant and warrant FDA consideration of a pathway for biogeneric evaluation and approval.

This study calculated the potential savings to the U.S. healthcare system that could be realized if the FDA were to develop a pathway for evaluation and approval of generic biologic medications, or biogenerics.

Background

Biologics, sometimes called biotech or specialty drugs, are medications that target a specific site or cell protein associated with a medical problem. Typically, they address medical problems that are relatively rare, and expensive and difficult to treat. Costs for these medications are increasing rapidly. An Express Scripts analysis of IMS sales data indicates an overall rate of expenditure increase of 16.6% from 2005 to 2006[1].

Unlike other prescription medications, biologic medications are available only in brand form, i.e., from the original patent holder at higher cost. Currently, no pathway to generic approval is available for these drugs. This study calculated the potential savings to the U.S. healthcare system that could be realized if the FDA were to develop a pathway for evaluation and approval of generic biologic medications or biogenerics.

[1] Express Scripts Analysis of IMS 2005-2006 National Sales Figures.

Methods

Four therapeutic categories were studied: interferons for multiple sclerosis; erythropoietin for anemia; growth hormone for growth failure; and insulin for diabetes. These classes were selected because they represent common uses for biologic medications, and because a sizeable proportion of their use is attributable to medications with patents that have or will expire in the near future. In each class, savings were modeled based on assumptions about: 1) the percentage of patients whose condition would be treated using a biogeneric as opposed to a brand-name biologic; 2) the percentage savings or discount associated with each use; 3) the expected volume of use (number of patients expected to use the medication times number of prescription claims per patient).

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For medications that were already off patent or would be off patent in 2007, this analysis assumed that 83.4% of utilizers would move to the chemically equivalent generic form of the medication. This assumption was based on Express Scripts' actual generic fill rate (GFR) for nonbiologic drugs with a narrow therapeutic index (NTI)[2]. Similar to biologics, NTI drugs require considerable amounts of patient monitoring. This conservative approach was taken because GFR for biologics may not reach the high levels that are experienced in the nonbiologic pharmacy market.

For situations where the generic was not chemically equivalent but was therapeutically equivalent (i.e., would be expected to produce the same therapeutic outcome), a more conservative assumption of 49% market shift was used. This rate of movement is based on historical Express Scripts success at moving market share to preferred agents.

The degree to which the cost of each medication would be reduced following generic adoption was estimated based on 1) analyst expectations for the potential market entry in the U.S. and 2) actual experience in Europe and Asia following biogeneric product introduction. For this model, a conservative discount of 25% was applied to biogenerics, which is consistent with Sandoz's discount when generic omnitrope was introduced in Germany[3].

This model assumes a 15% trend per year, composed of both increased price and utilization. This amount assumes that recent trends will continue into the future.

[2] Internal Express Scripts Analysis of Drugs with a Narrow Therapeutic Index. January 2007.
[3] Generic biologics: One step closer to reality. http://www.drugtopics.com/drugtopics/article/articleDetail.jsp?id=360618. Accessed January 15, 2007.

Methods Continued

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Interferons for Multiple Sclerosis

Key Facts

Population	340,000[4]
# Rx/user/year	8.49[5]

This group of therapies is dominated by interferons (beta-1a and beta-1b).

Medication Name	Chemical	Patent Expiration	Market Share[6]	Market Share With Biogenerics
Avonex®	interferon beta-1a	2003	39.5%	6.6%
Copaxone®	glatiramer acetate	2014	31.8%	31.8%
Rebif®	interferon beta-1a	2005	14.3%	2.4%
Betaseron®	interferon beta-1b	2007	14.3%	2.4%
interferon beta-1a			0.00%	44.9%
interferon beta-1b			0.00%	11.9%

[7]

Clinical analysis of therapeutic equivalence in this category concluded that there was no substitutability among products.

Clinical analysis of therapeutic equivalence in this category concluded that there was no substitutability among products. Accordingly, this analysis assumed that only chemically equivalent biogenerics would be used in place of brand-name biologics. Thus, Copaxone market share was not impacted by the biogeneric modeling.

To calculate the number of patients affected, a Cowen and Company analyst report provided the entire market size for patients who take an interferon to treat multiple sclerosis. This datum was coupled with the average number of prescriptions filled per patient per year in this category in order to arrive at total sales.

[4] Therapeutics Categories Outlook; Comprehensive Study. Cowen and Company. October 2006. p.480
[5] Express Scripts *2005 Drug Trend Report.*
[6] Express Scripts *2005 Drug Trend Report.*
[7] Table restricted to therapies with market share greater than 5%.

Methods Continued

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Erythropoietin for Anemia

Key Facts

Population	800,000[8,9]
# Rx/user/year	7.30[10]

Assessment of the market share for erythropoietins concluded that a data source including public insurance should be used to calculate market share. A commercial data set was reasoned to exclude a large amount of treatment for kidney failure, one of the principal uses of erythropoietin, which is covered by Medicare. Accordingly, IMS market (size) data was used for this therapeutic group.

Medication Name	Chemical	Patent Expiration	Market Share[11]	Market Share With Biogenerics
Aranesp®	darbepoetin alfa	2016	38.8%	19.8%
Procrit®	epoetin alfa	2004	29.2%	4.8%
Epogen®	epoetin alfa	2004	32.0%	5.3%
epoetin alfa			0.0%	70.1%

[12]

A commercial data set was reasoned to exclude a large amount of treatment for kidney failure, one of the principal uses of erythropoietin, which is covered by Medicare.

While the primary patent on epoetin alfa has expired, additional patents have been granted, which may extend the protection of Procrit and Epogen. This model assumes that these patents would not be a barrier to biogeneric entry in this therapeutic area. Thus, it was assumed that chemically equivalent biogeneric alternatives for these products would be available.

While not chemically equivalent, darbepoetin alfa and epoetin alfa are therapeutically equivalent. Thus, the model assumed 49% of Aranesp patients would move to a biogeneric.

The American market (size) for erythropoietins was derived from a combination of national market share for patients on kidney dialysis and analyst reports on the prevalence of oncolytic induced anemia. The average number of fills for oncolytic induced anemia was derived from the Express Scripts *2005 Drug Trend Report*.

[8] Combination of national estimates for oncology and renal use. Anemia in cancer: Some pathophysiological aspects.http://theoncologist.alphamedpress.org/cgi/content/abstract/8/suppl_1/19. Accessed January 12, 2007.
[9] Amgen's enemies. http://www.forbes.com/forbes/2006/1030/126.html. Accessed January 12, 2007.
[10] Combination of Express Scripts *Drug Trend Report* and National Institute for Diabetes & Digestive & Kidney Disease recommended treatment. http://kidney.niddk.nih.gov/kudiseases/pubs/anemia/index.htm. Accessed February 7, 2007.
[11] Express Scripts *2005 Drug Trend Report.*
[12] IMS national sales data, 2006. Accessed January 19, 2007.

Methods Continued

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Growth Hormone for Growth Failure

Key Facts

Population	12,000[13]
# Rx/user/year	3.24[14]

The market for growth hormone products is predominated by somatropin products. Express Scripts *2005 Drug Trend Report* market-share data was used to calculate the number of patients using these therapies and the average number of prescription claims per patient per year.

Medication Name	Chemical	Patent Expiration	Market Share[15]	Market Share With Biogenerics
Nutropin®	somatropin	2003	32.4%	5.4%
Genotropin®	somatropin	2004	26.1%	4.3%
Humatrope®	somatropin	2003	25.3%	4.2%
Saizen®	somatropin	2003	6.8%	1.1%
Norditropin®	somatropin	2014	6.4%	1.1%
Serostim®	somatropin	2003	1.7%	0.9%
Somavert®	pegvisomant	2020	1.2%	0.6%
Tev-Tropin®	somatropin		0.1%	0.0%
somatropin			0.0%	82.4%

The market for growth hormone products is predominated by somatropin products. Express Scripts 2005 Drug Trend Report *market share data was used to calculate the number of patients using these therapies and the average number of prescription claims per patient per year.*

The market size for this therapeutic area was researched and the average number of fills per patient per year were derived from the Express Scripts *2005 Drug Trend Report.*

[13] Growth hormone and children: New era. http://query.nytimes.com/gst/fullpage.html?sec=health&res=9C0CE5D6123BF932A25751C0A966958260. Accessed February 7, 2007.
[14] Express Scripts *2005 Drug Trend Report.*
[15] Express Scripts *2005 Drug Trend Report.*

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Insulin for Diabetes

Key Facts

Population	14,600,000[16]
# Rx/user/year	14.01[17]

The market for insulins includes many products with different formulations of short-acting and long-acting insulin.

Medication Name	Chemical	Patent Expiration	Market Share[18]	Market Share With Biogenerics
Lantus®	insulin glargine	2015	39.1%	39.1%
Humalog®	insulin lispro	2013	21.8%	21.8%
Humulin N®	insulin	2002	15.4%	2.6%
Novolog®	insulin aspart	2014	9.6%	9.6%
Humulin 70/30®	insulin	2002	8.3%	1.4%
Humulin R®	insulin	2002	5.8%	1.0%
insulin n			0.0%	12.8%
insulin 70/30			0.0%	7.0%
insulin r			0.0%	4.8%

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The market size for this therapeutic area was researched and the average number of fills per patient per year were derived from the Express Scripts *2005 Drug Trend Report.*

[16] Total prevalence of diabetes in the United States, all ages, 2005. http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#7. Accessed January 18, 2007.
[17] Express Scripts *2005 Drug Trend Report.*
[18] Express Scripts *2005 Drug Trend Report.*
[19] Table includes injectable insulins that experienced market share movement in model.

Results

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Potential Savings of Biogenerics in the United States

Market-share movement to discounted biogeneric products can result in $3.5 billion savings in the first year following a biogeneric pathway approval. Assuming a 15% trend per year, which is on the conservative side of Express Scripts' trend analysis, savings could total $71 billion over the first 10 years.

Year	Multiple Sclerosis	Erythropoietins	Growth Hormone	Insulin	Total
1	$678,107,580	$2,004,260,421	$27,657,855	$797,059,877	**$3,507,085,732**
2	$779,823,717	$2,304,899,484	$31,806,533	$916,618,859	**$4,033,148,592**
3	$896,797,274	$2,650,634,407	$36,577,513	$1,054,111,687	**$4,638,120,881**
4	$1,031,316,865	$3,048,229,568	$42,064,140	$1,212,228,440	**$5,333,839,013**
5	$1,186,014,395	$3,505,464,003	$48,373,761	$1,394,062,706	**$6,133,914,865**
6	$1,363,916,554	$4,031,283,603	$55,629,825	$1,603,172,112	**$7,054,002,094**
7	$1,568,504,037	$4,635,976,144	$63,974,298	$1,843,647,929	**$8,112,102,409**
8	$1,803,779,643	$5,331,372,565	$73,570,443	$2,120,195,119	**$9,328,917,770**
9	$2,074,346,589	$6,131,078,450	$84,606,010	$2,438,224,386	**$10,728,255,435**
10	$2,385,498,578	$7,050,740,217	$97,296,911	$2,803,958,044	**$12,337,493,751**
Total	$13,768,105,231	$40,693,938,861	$561,557,288	$16,183,279,161	**$71,206,880,541**

The single largest contributor to the savings would come from the erythropoietin market. This finding is of particular interest to the federal government, which funds treatment of patients on kidney dialysis.

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Limitations

This report includes assumptions derived from analysis of a commercially insured population. Further, it assumes that tools from a commercially insured population (e.g., automatic generic substitution, prior authorizations and preferred product pricing incentives) would be employed to realize the savings opportunity.

Conclusion

The unrealized savings that biogenerics could generate warrant FDA development of a pathway for biogeneric evaluation and approval. The savings opportunities, particularly to government-funded insurance programs, are substantial and merit legislative actions to realize these savings.