

# The Global Use of Medicines: Outlook Through 2015



May 2011

# Introduction

The future level of global spending on medicines has implications for healthcare systems and policy makers across developed and emerging economies. Key decision makers share the common goals of improving health outcomes, while controlling costs and expanding access to more of their citizens. In this context, spending on biopharmaceuticals, often considered a driver of cost growth, represents an important opportunity to achieve increased access, cost reductions and better outcomes.

Past spending growth offers few clues to the level of growth to expect through 2015. Unprecedented dynamics are at play – including historically high levels of patent expiry, rapid expansion of demand for medicines in the world’s fastest growing economies, fewer new medicines reaching patients, and more moderate uptake of those that do become available. These dynamics are driving rapid shifts in the mix of spending between branded products and generics; and between spending in the major developed countries and those 17 high growth emerging countries referred to as “pharmerging”.

In this report we quantify the impact of these dynamics and examine the spending and usage of medicines in 2015, globally and for specific therapy areas and countries. We intend this report to provide a foundation for meaningful discussion about the value, cost and role of medicines over the next five years in the context of overall healthcare spending.

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## Key 2015 Numbers

Spending \$1.1 Trillion

Patent “dividend” \$98Bn

Spending on generics \$400-430Bn

U.S. spending growth 0-3%

China spending \$115-125Bn

Pharmerging spending share 28%

Oncology spending \$75-80Bn

Off-invoice discounts and rebates \$65-75Bn

# Executive summary

## SPENDING ON MEDICINES

Spending on medicines will reach nearly \$1,100Bn in 2015, reflecting a slowing growth rate of 3–6% over the five year period compared to 6.2% annual growth over the past five years. Absolute global spending growth is expected to be \$210–240Bn, compared to \$251Bn since 2005. The U.S. share of global spending will decline from 41% in 2005 to 31% in 2015, while the share of spending from the top 5 European countries will decline from 20% to 13% over the same period. Meanwhile, 17 high growth emerging markets led by China, will contribute 28% of total spending by 2015, up from only 12% in 2005. The next five years will also see an accelerating shift in spending toward generics, rising to 39% of spending in 2015, up from 20% in 2005.

## KEY DRIVERS OF CHANGE

In the major developed markets, spending on branded medicines will remain essentially unchanged in 2015 from the level in 2010, since all increases in spending on brands will be offset by reduced spending on those brands losing patent protection.

Innovative products are expected to be launched which will bring important new treatment options to patients with cancer, diabetes, thrombosis and debilitating diseases of the central nervous system. Of particular note are the products for diabetes that are expected to bring new options to patients. Additional important new therapies with orphan drug designations or narrow indications are also expected, but will not be a major driver of increased spending.

All of the increase in spending on brands – both new and existing – will be offset by patent expiries which will reduce brand spending by \$120Bn through 2015. Only spending on generics will increase in developed markets over the next five years. In high growth emerging markets, spending will increase by \$150Bn, as improved access and strengthening economies drive higher demand, primarily for generic drugs.

## POLICY-DRIVEN CHANGES AND IMPACTS THROUGH 2015

Significant policy changes, made in 2010, will have longer-term impacts on the spending and usage of medicines across many countries including the passage of the Affordable Care Act in the U.S., a sweeping reform of Japan's unique every-other-year price-cut system, and several new reforms to rebalance spending priorities in each major European market. Important steps were also taken in the U.S. and Europe in the development of scientific guidelines for the approval of biosimilars.

In several markets rebates and discounts, which are not reflected in IMS audits, are increasingly being applied by public and private payers particularly in the U.S., France and Germany. The amount of these off-invoice discounts in 2010 is estimated to be \$60–65Bn, rising to \$65–75Bn in 2015. If the discounts and rebates were fully reflected in our spending estimates, the five year increase would be \$210–230Bn rather than the \$210–240Bn referenced elsewhere in this report.

## KEY THERAPY AREAS

Spending on most therapies will grow at slower rates – or even decline – through 2015. Specialty medicines will experience continued growth in the medium term driven by novel mechanisms, improved efficacy and relatively large patient populations, leading to increased uptake of these high-value medicines.

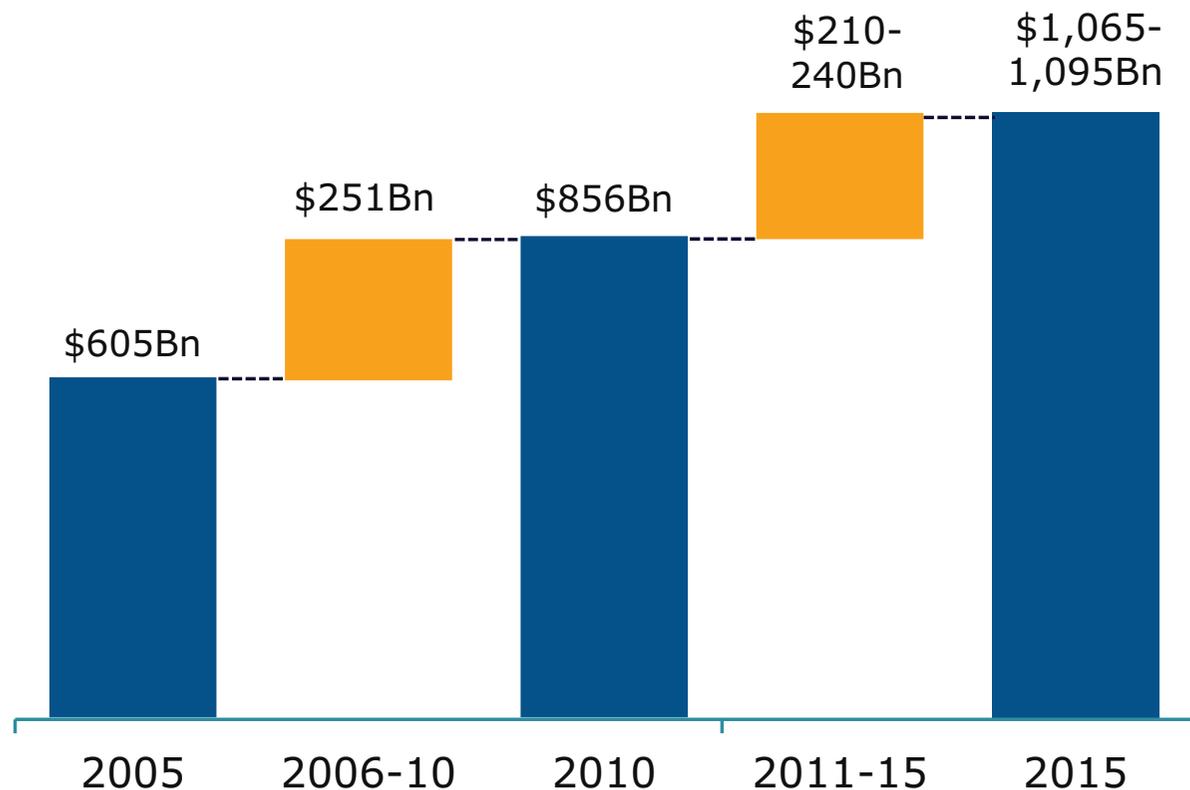
Global oncology spending will reach \$75Bn by 2015, rising at a much slower rate than in the past five years, as existing targeted therapies have already been widely adopted in most developed markets, some major products will be exposed to generic competition, and new products, with the potential to extend lives, will add treatment options in several major tumors, but will not contribute to significantly higher spending.

Global spending on diabetes will increase by 4–7% over the next five years, accompanying increased prevalence of Type 2 diabetes and treatment rates especially in countries such as China, India, Mexico and Brazil. Greater use of oral antidiabetic agents is expected due to their convenience and efficacy.

Annual spending growth through 2015 will slow to 2–5% for asthma and COPD medicines compared to 9% growth over the past five years; spending on lipid regulators will fall to \$31Bn in 2015 from \$37Bn in 2010; and patent expiries will limit angiotensin inhibitors growth to 1–4% over the next five years compared to 12% over the prior five year period.

# Spending on medicines will reach nearly \$1,100Bn in 2015

Global Spending on Medicines



Source: IMS Market Prognosis, Apr 2011

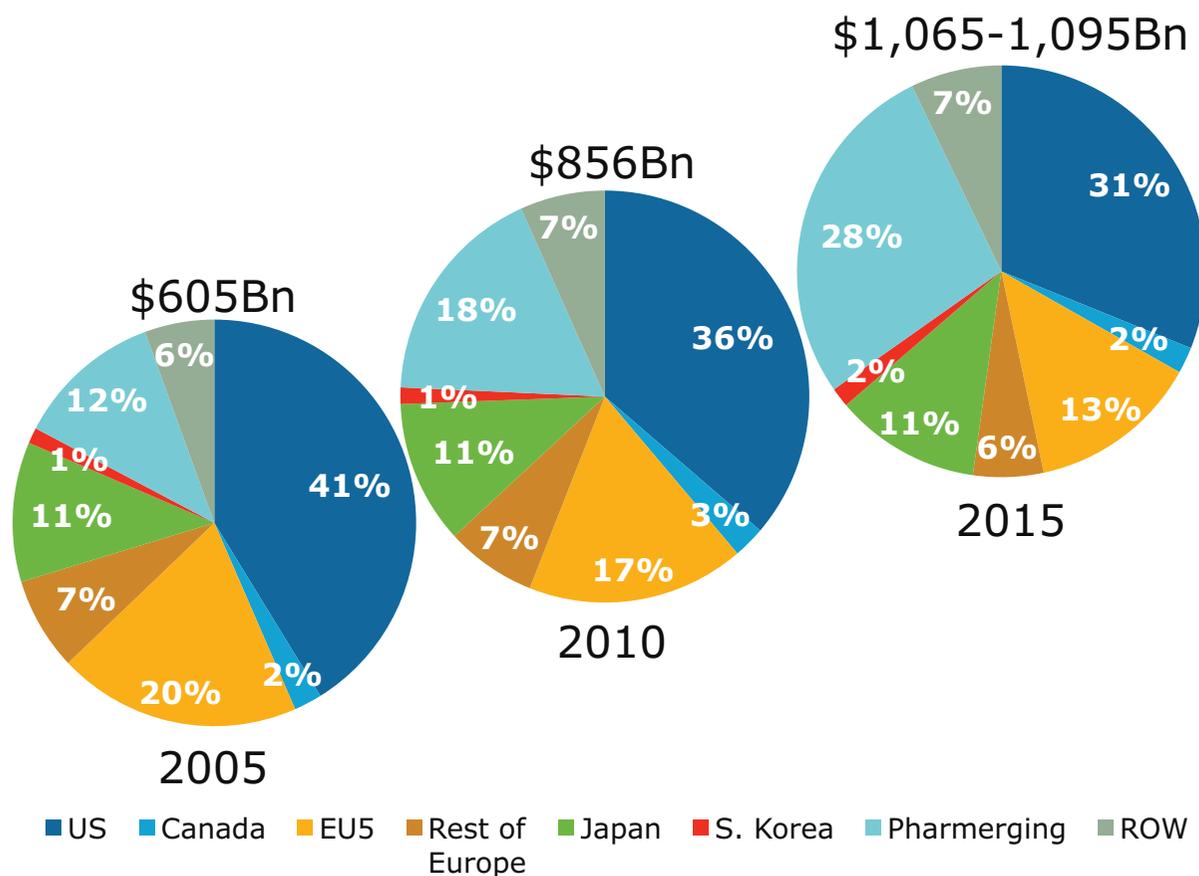
- Growth in the next five years will slow to 3-6% CAGR compared to 6.2% over the past five years.
- Spending on medicines globally is expected to exceed \$1 trillion dollars in 2014 and to reach nearly \$1,100Bn by 2015.
- Absolute growth is expected to be \$210-240Bn compared to \$251Bn in the prior five years.
- Removing the effect of exchange rate fluctuations, growth will be \$230-250Bn on a constant dollar basis, compared to \$228Bn in the previous five years.

**Chart notes**

Spending in US\$ with variable exchange rates.  
Compound annual growth rate (CAGR) in US\$ using constant exchange rates.

# U.S. and EU5 account for only 44% of spending in 2015

Spending by Geography



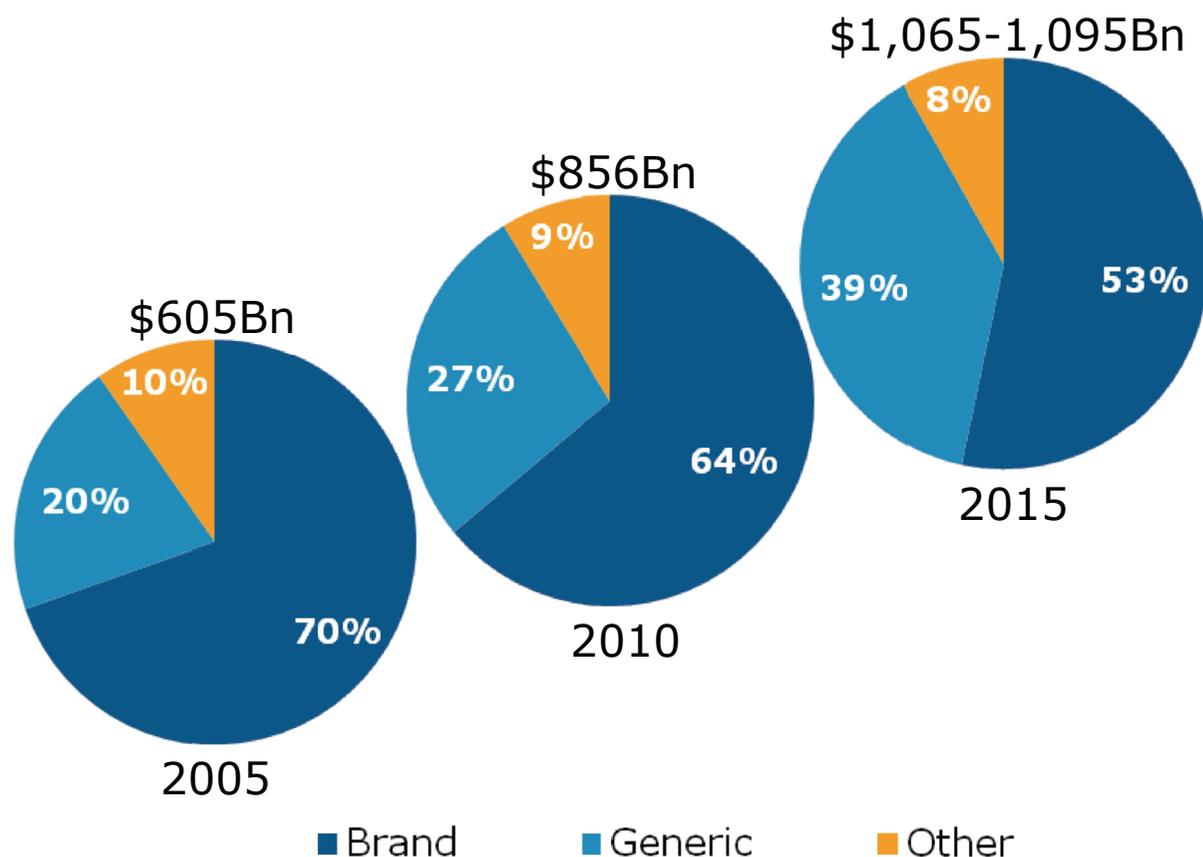
- The U.S. share of global spending will decline from 41% in 2005 to 31%, while the EU5 share of spending will decline from 20% to 13% in 2015.
- Pharmerging markets, surpassing EU5 last year, will reach 28% of global spending in 2015.
- Share of global spending remains steady for Japan, the rest of Europe and Canada.

**Chart notes**

Spending in US\$ with variable exchange rates.

# An accelerated shift in spending on generics is expected

Spending by Segment



Source: IMS Market Prognosis, Apr 2011

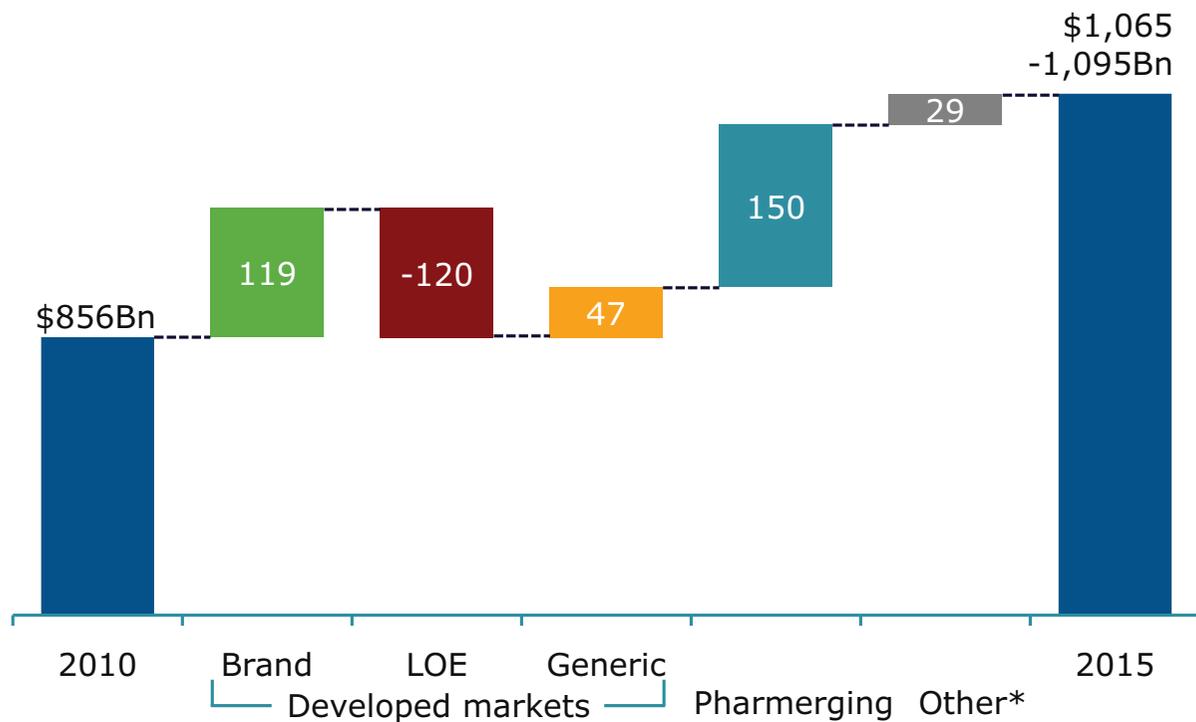
- Brands accounted for nearly two-thirds of global pharmaceutical spending in 2010 but, as patents expire in developed markets, that share is expected to decline.
- Rapid growth in pharmerging markets is largely from spending on generic drugs which will contribute to the rise in the generic share of spending.
- Global generic drug spending is estimated to be \$234Bn in 2010, up from \$124Bn in 2005.
- Generics spending in 2015 is expected to be between \$400-430Bn, 70% of which will be outside developed markets.

**Chart notes**

Spending in US\$ with variable exchange rates. Brand, Generic and Other segments defined by IMS's proprietary market segmentation methodology which covers 31 leading pharmaceutical markets globally. Estimated global generic spending includes estimates of unaudited markets and market segments. Estimates of Brand and Generic segments in other markets based on IMS Institute for Healthcare Informatics research. Brands include off-patent brands. Generics include branded generics. Other includes OTC and non-categorized products.

# Pharmerging markets and generics are the only drivers of growth

Components of Change in Total Spending



\*Other includes Rest of World +\$27Bn, Other developed market growth +\$17Bn, Exchange rate change -\$15Bn  
 Source: IMS Market Prognosis, Apr 2011

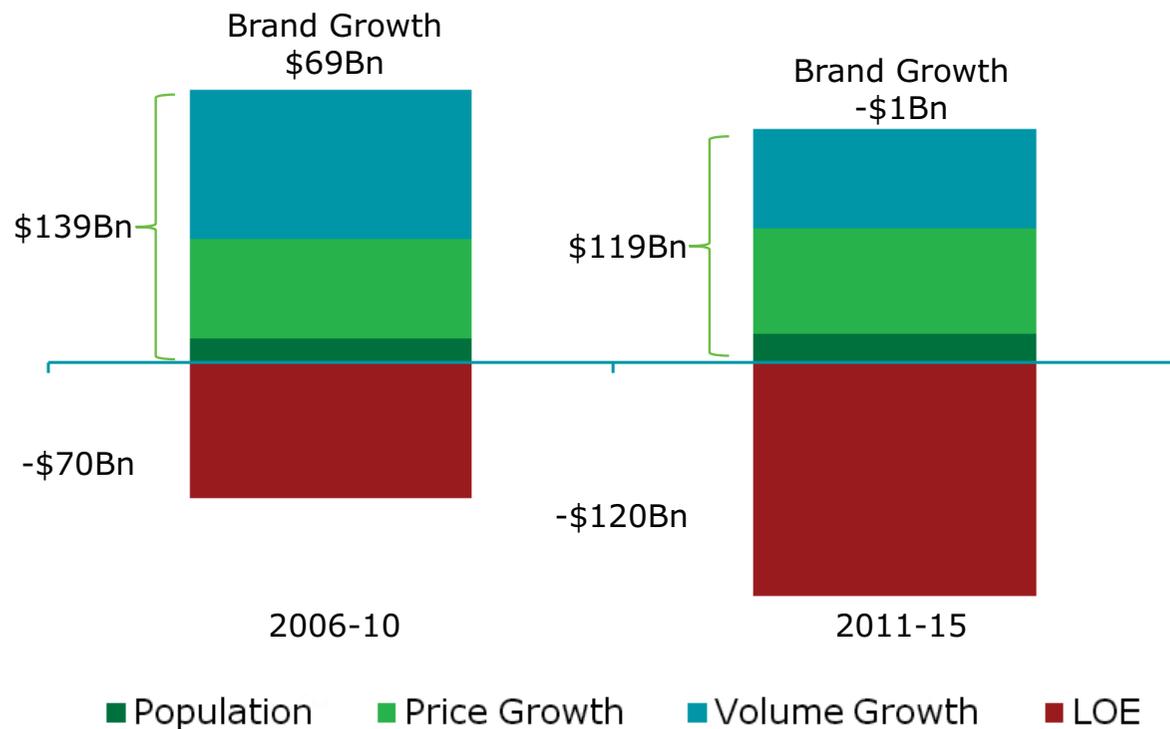
- The largest segment of growth in the next five years will be pharmerging markets, driven by increased access through reforms and economic growth.
- Generic spending will increase by \$47Bn, approximately 60% from increased utilization of existing generic products and 40% from newly available generics.
- Despite the largest period of patent expiry in history, brands will offset expiries with organic growth and new products.
- The rest of the world will make a small contribution to increased spending, but masks a disparate and volatile expansion of health spending globally.

**Chart notes**

Spending in US\$ with variable exchange rates.  
 Developed countries are US, Japan, Germany, France, Italy, Spain, Canada, United Kingdom and South Korea.  
 Brand (including vaccines), Generic and Loss of Exclusivity (LOE) are defined using IMS MIDAS market segmentation methodology.  
 Other developed market growth includes OTC and non-categorized products.

# The impact of patent expiries will offset growth in brand spending

## Components of Change in Brand Spending



- Spending for branded products will be nearly the same in 2015 as in 2010.
- Protected brands will grow at 7-8%, approximately 3-4% of which will come from price growth, mostly from the U.S.
- Population and aging trends will add 1% to age and drug-use adjusted spending.
- Volume growth for branded products, including expected new launches, will be much lower than in the past five years as generics are increasingly preferred to existing or new brands.

### Chart notes

Spending growth in US\$ with constant exchange rates.

Protected brands from IMS MIDAS market segmentation methodology.

Loss of Exclusivity (LOE) impact is calculated as the loss of brand sales due to the impact of expected generic entry.

Population and aging trends include population growth estimates from the Economist Intelligence Unit and age-related drug-usage adjustments from IMS Market Prognosis.

Source: IMS Institute for Healthcare Informatics; Market Prognosis, Apr 2011

# Recent and future novel therapies address unmet patient needs

## Selected Product Launches 2009-2013

Disease area	Launched	Upcoming
<b>Arrhythmia</b>	Brinavess™ (vernakalant) Multaq® (dronedarone)	
<b>Autoimmune</b>	Simponi® (golimumab) Stelara™ (ustekinumab)	tofacitinib (JAK inhibitor)
<b>Diabetes</b>	Nesina® (alogliptin, DPPIV) Onglyza™ (saxagliptin, DPPIV) Victoza® (liraglutide, GLP-1)	Bydureon™ (exenatide, GLP-1) canagliflozin (SGLT2) dapagliflozin (SGLT2) lixisenatide (GLP-1) Tadjenta™ (linagliptin, DPPIV)
<b>Hepatitis C</b>		Victrelis™ (boceprevir, NS3-4A PI) Incivek® (telaprevir, NS3-4A PI)
<b>Lupus</b>	Benlysta® (belimumab)	
<b>Melanoma</b>	Yervoy™ (ipilimumab)	vemurafenib
<b>Multiple sclerosis</b>	Ampyra® (fampiridine, oral) Gilenya® (fingolimod, oral)	laquinimod (oral) ocrelizumab teriflunomide (oral)
<b>Osteoporosis</b>	Prolia® (denosumab)	
<b>Thrombosis/ Acute coronary syndrome</b>	Brilique™ (ticagrelor, P2T) Effient® (prasugrel, Xa) Pradaxa® (dabigatran etexilate, Xa)	Eliquis® (apixaban, Xa)
<b>Prostate cancer</b>	Firmagon® (degarelix) Jevtana® (cabazitaxel) Provenge® (sipuleucel-T)	Zytiga™ (abiraterone acetate)

Source: IMS Institute for Healthcare Informatics, Apr 2011

- 30 innovative products, expected to be launched between 2009 and 2013, will drive growth between 2010 and 2015 as they become available around the world.
- These developments reflect new mechanisms of action or delivery in major disease areas, bringing new therapeutic options to patients for whom available treatments are ineffective or whose side-effects make them inappropriate.
- Of particular note are the large number of products for diabetes with different mechanisms of action that are expected to bring new options to patients including the new SGLT2 class of drugs.
- Additional important new therapies with orphan drug designations or narrow indications are expected, but will not be a major driver of increased spending.

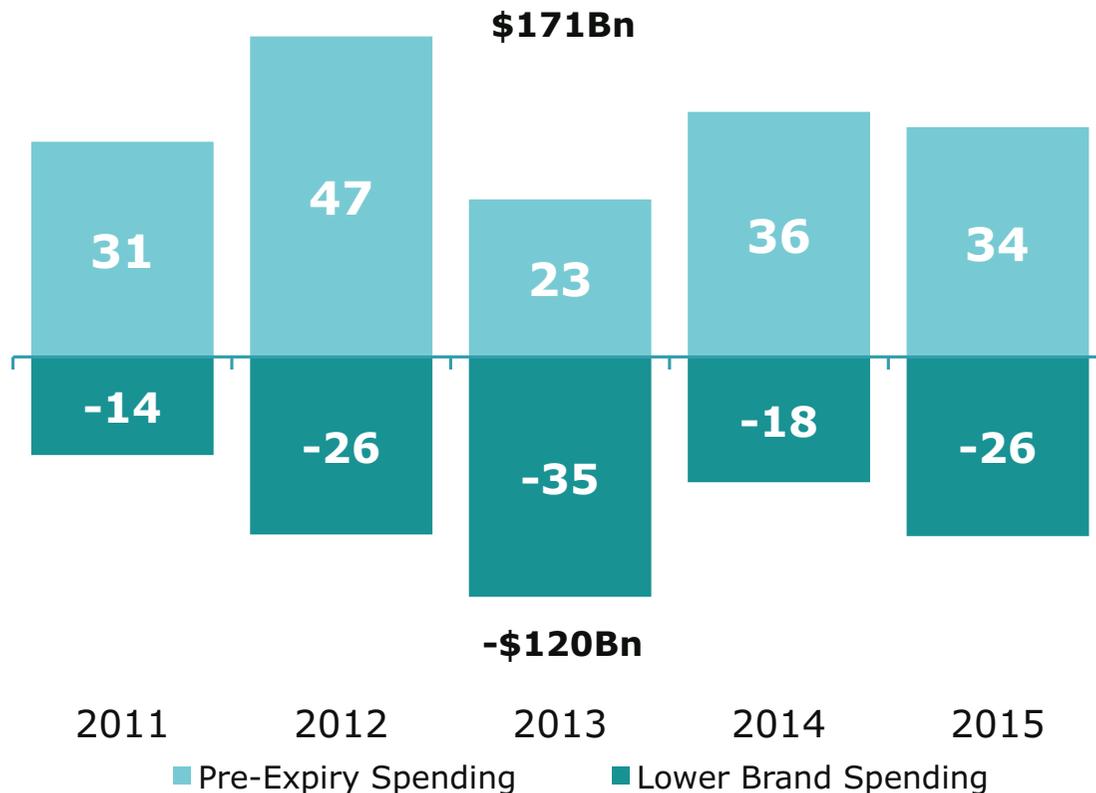
### Chart notes

Table includes selected recently launched New Active Substances (NAS) and late-stage pipeline. A NAS is the first commercial launch of a novel therapeutic entity. Products with orphan designated indications are not shown. Abbreviations: DPP-IV: dipeptidyl peptidase (DPP)-IV inhibitor; Xa: Xa coagulation factor inhibitor; SGLT: sodium-glucose cotransporter-2 (SGLT2) inhibitor; GLP-1: glucagon-like peptide-1 (GLP-1); P2T: platelet purinoceptor 2T; JAK: janus-like kinase inhibitor.

Prolia (denosumab) is the first monoclonal antibody for osteoporosis and is also marketed as Xgeva for bone metastases.

# Patent expiries will reduce brand spending by \$120Bn through 2015

## Developed Markets Patent Expiries



Source: IMS Institute for Healthcare Informatics; MIDAS, Dec 2010

- Patent expiries will save payers in developed markets \$120Bn in the next five years, offset by \$22Bn of expected generic spending for these medicines, resulting in a \$98Bn patent “dividend” in these years.
- This compares to \$70Bn in 2006-10 which was offset by \$16Bn of incremental generic usage of those expired brands, a net savings of \$54Bn.
- Patents are expected to expire in one or more of the developed markets for 11 of the top 20, or 6 of the top 10, current leading medicines including Lipitor<sup>®</sup>, Plavix<sup>®</sup>, Advair<sup>®</sup> Diskus<sup>®</sup>, Nexium<sup>®</sup> and Seroquel<sup>®</sup>.

### Chart notes

Spending expressed in US\$ at constant exchange rates.

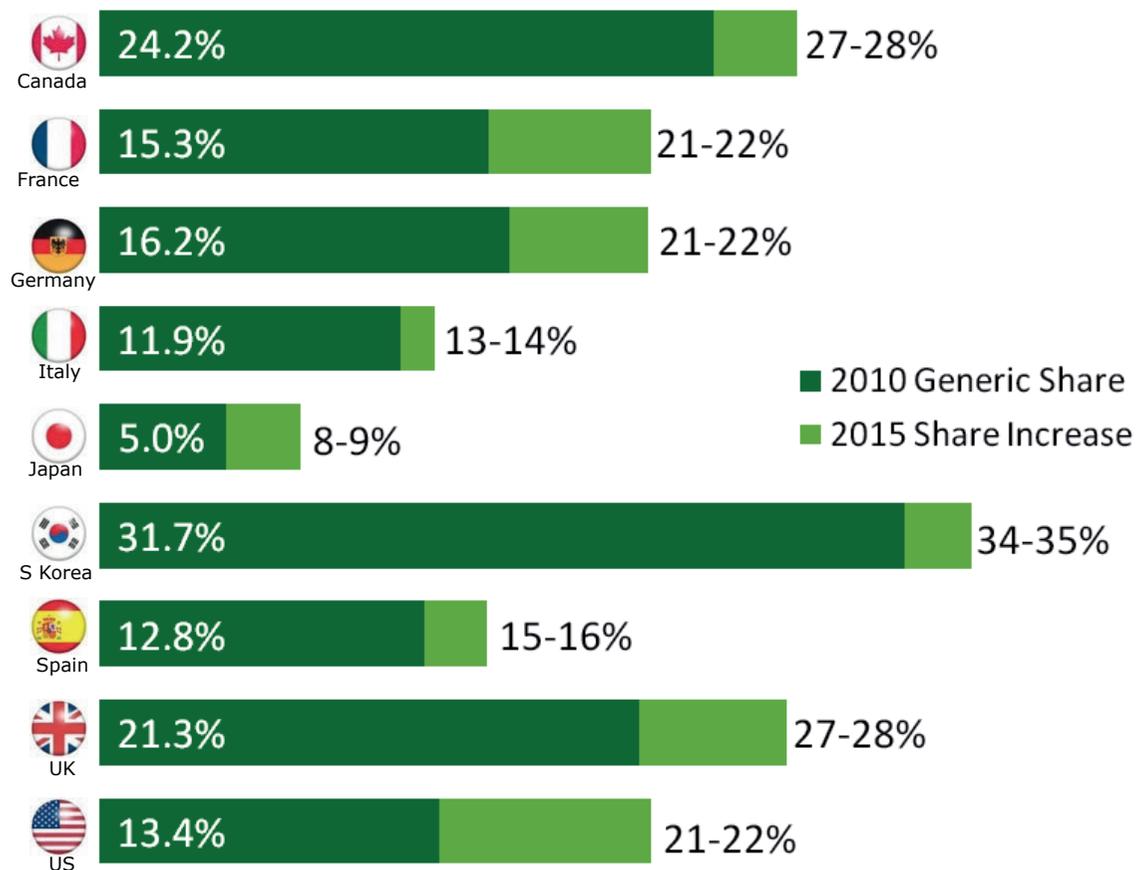
Chart covers developed markets.

Lower brand spending reflects the expected impact in that year on drug spending of patent expiries (including continuing impact from expiries in prior years).

Pre-expiry spending are the projected sales in the year prior to expiry.

# Generics will exceed 20% of spending in most developed markets

## Developed Markets Generic Share



Source: IMS Market Prognosis, Apr 2011

- Increased generic spending in the next five years will be driven by generic competition in new molecules due to patent expiry.
- Additional generic share gains will come from increased incentives for the usage of generics in many markets.
- The U.S. will see the largest expansion of generics market spending, but the 7-8% gain will largely be from new generics as U.S. pharmacists already dispense generics, when available, 93% of the time.
- Japan will remain the developed market with the lowest generic share despite significant policy incentives to increase generic prescribing and dispensing.
- South Korea, with its well-developed domestic industry, will continue to spend the most on generics as a share of spending.

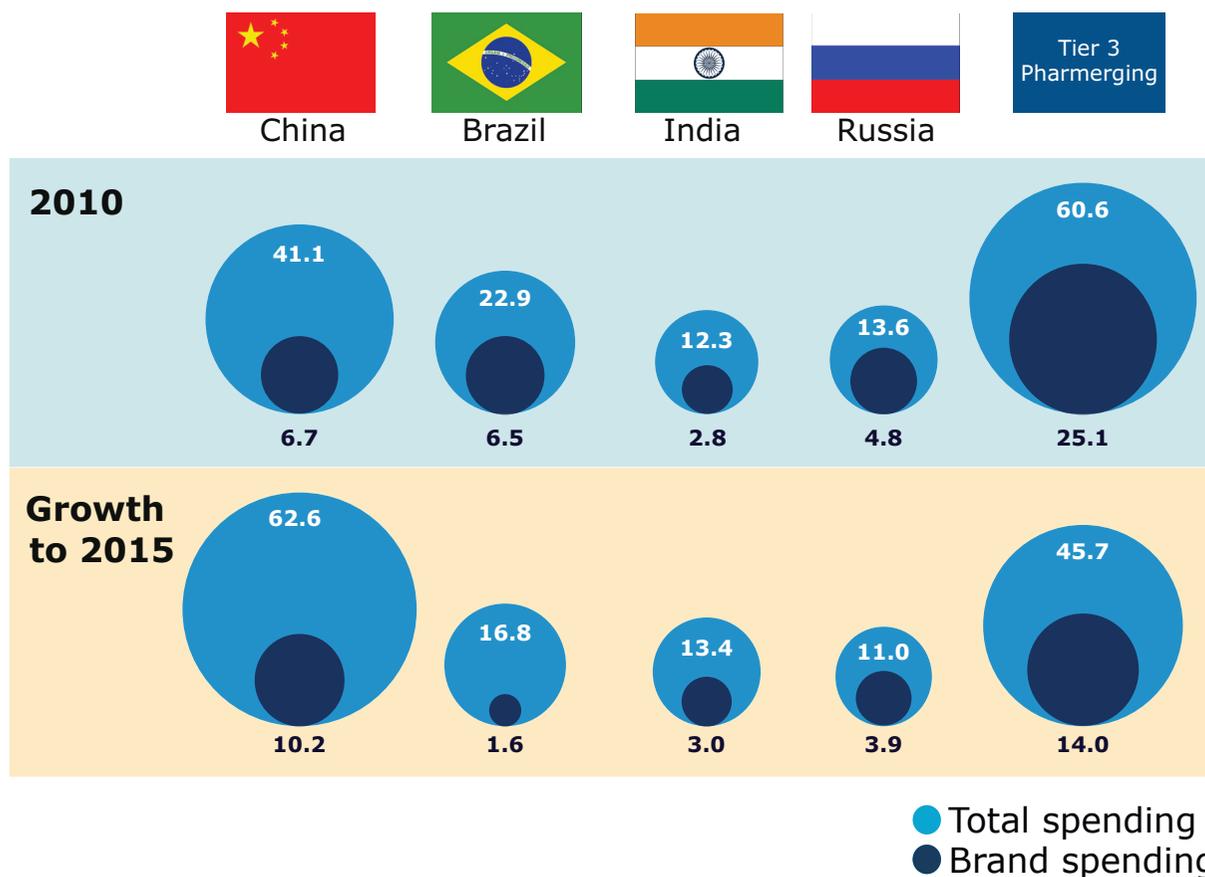
### Chart notes

Spending share in US\$ with variable exchange rates.

Generic share of total pharmaceutical spending is calculated using IMS MIDAS market segmentation methodology. Generic segment includes branded generics and excludes OTC medicines.

# In pharmerging markets growth is mostly from generic drugs

## Pharmerging Spending and Growth



Source: IMS Market Prognosis, Apr 2011

- Pharmerging countries are expected to nearly double pharmaceutical spending, adding \$150Bn by 2015. Of the total increase in spending, approximately 20% will come from branded products.
- Many of the pharmerging countries have strong domestic companies which market low cost generics, branded generics, and in some cases, unauthorized copies of original brands.
- Political pressure to provide greater access to healthcare is driving significant government-supported expansion of access to medicines across these countries.
- Patients pay for the majority of medicines out-of-pocket in these markets, with a few exceptions, which limits the usage of expensive newer medicines.

### Chart notes

Spending share in US\$ with variable exchange rates.

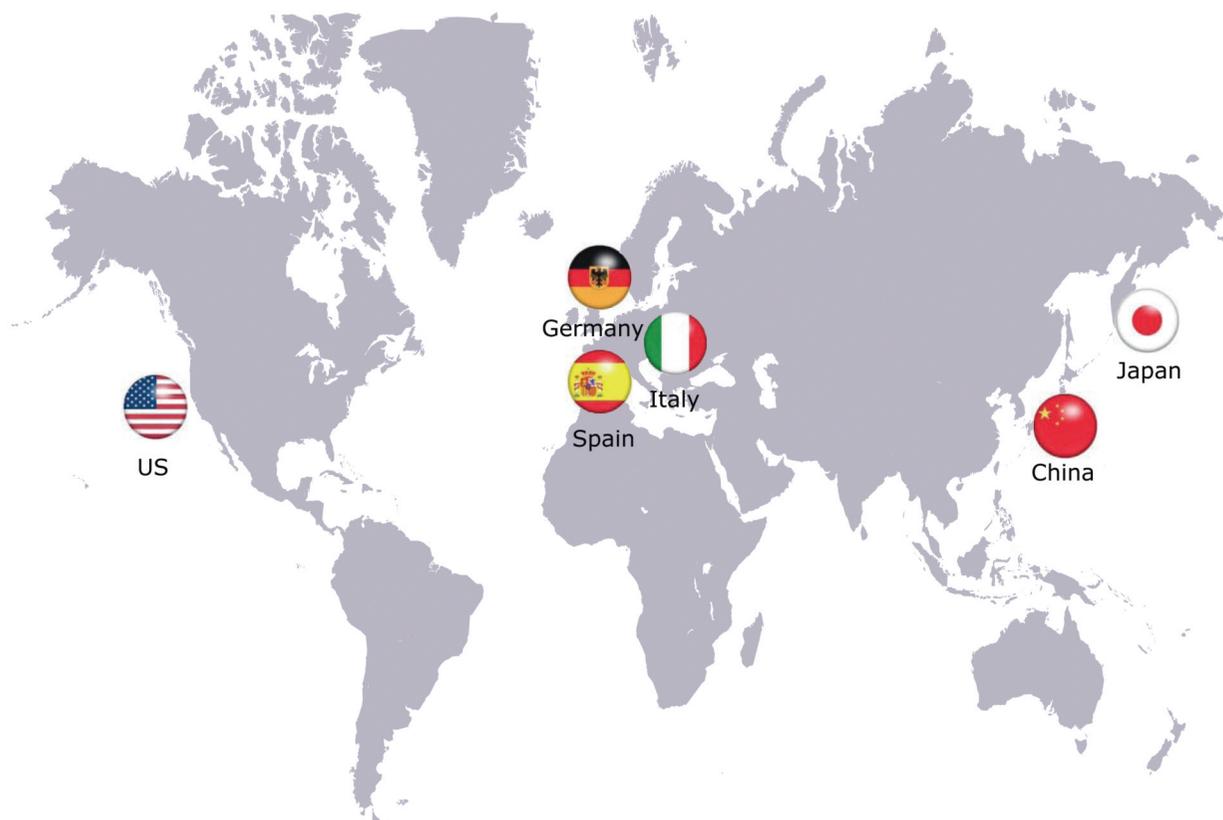
Growth in US\$ at constant exchange rates.

Gross Domestic Product (GDP) from the Economist Intelligence Unit.

Brands include vaccines, but exclude branded generics, using IMS MIDAS market segmentation methodology.

# Significant policy changes in 2010 will have longer-term impacts

## Impact of Policy Changes on Cost & Access

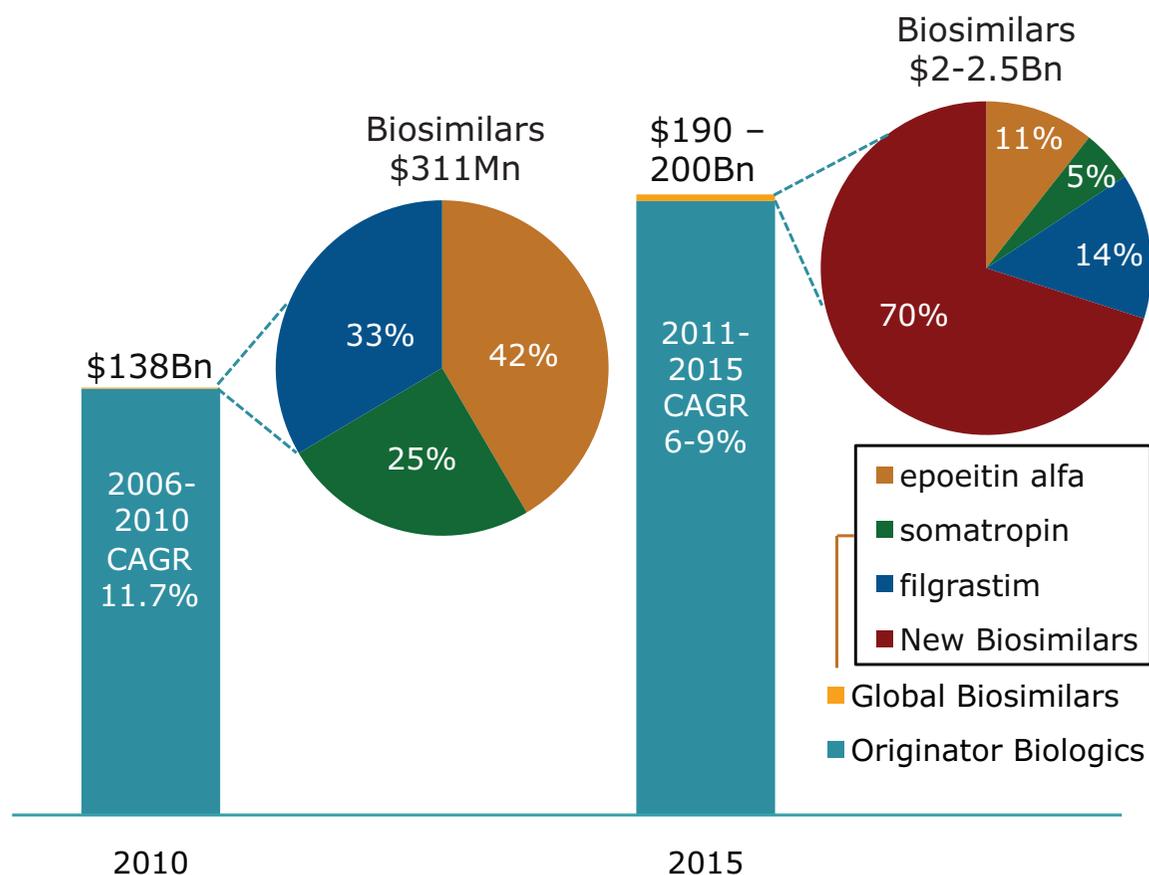


Source: IMS Institute for Healthcare Informatics, Apr 2011

- The U.S. passed the Affordable Care Act which expands health insurance coverage to 25–30Mn uninsured Americans and is intended to address health system costs, quality and access.
- Japan implemented its first price cut under its new protected innovative products policy, initiating a change in balance between innovation and the use of off-patent products.
- Spain and Italy made substantial reductions to generic and off-patent brand prices to encourage higher generic utilization and lower health system costs.
- Germany implemented mandatory cost-benefit evaluations of new medicines after their first year on the market, potentially restricting pricing and reimbursement.
- China applied widespread price cuts to ensure the sustainability of universal healthcare coverage.

# Biosimilars are emerging rapidly but adoption to date is limited

## Global Biologics Spending



Source: IMS Institute for Healthcare Informatics; MIDAS Dec 2010

- Global biologic spending was \$138Bn in 2010, compared to \$311Mn for biosimilars.
- Much of the global biologics spending is concentrated in the U.S. Biosimilar spending is concentrated in Germany and other European markets which adopted approval guidelines earlier, and now account for over 80% of global biosimilars spending.
- Europe’s approval guidelines for monoclonal antibodies, expected later this year, will add new molecules to the competitive space through 2015.
- The U.S. approval pathway, included in the Affordable Care Act, grants 12 years of market exclusivity to originator biologics. New biosimilars are expected to enter the U.S. market by 2014, including epoetin alfa and filgrastim, which currently have approved biosimilars only outside the U.S.

### Chart notes

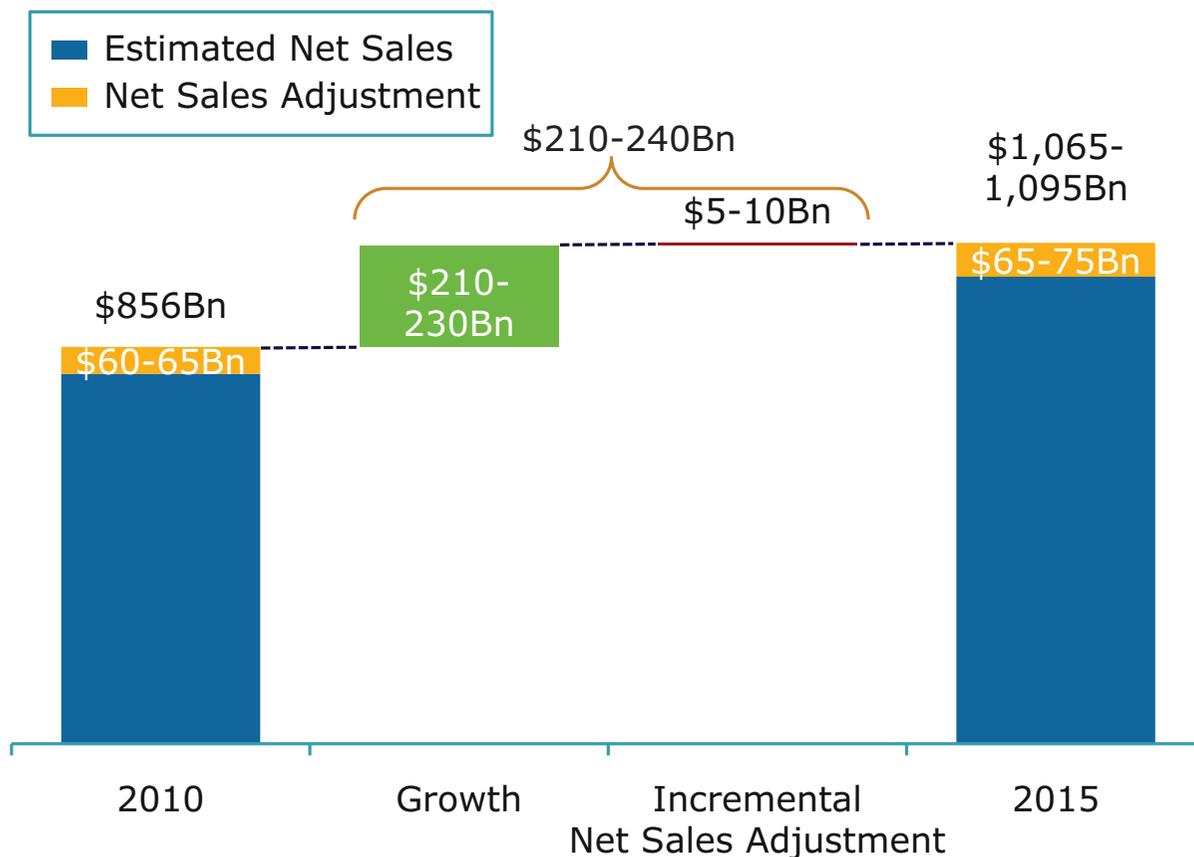
Spending in US\$ with variable exchange rates.

Biosimilar products are biologic products approved in a country which has an abbreviated approval process for biologic products that reference an originator biologic in the regulatory submission.

Products marketed in countries without a biosimilar approval pathway and for which the originator has not granted a license are not considered biosimilars.

# Increased rebates and discounts have \$5-10Bn impact on growth

Global Spending to 2015



Source: IMS Market Prognosis, Apr 2011

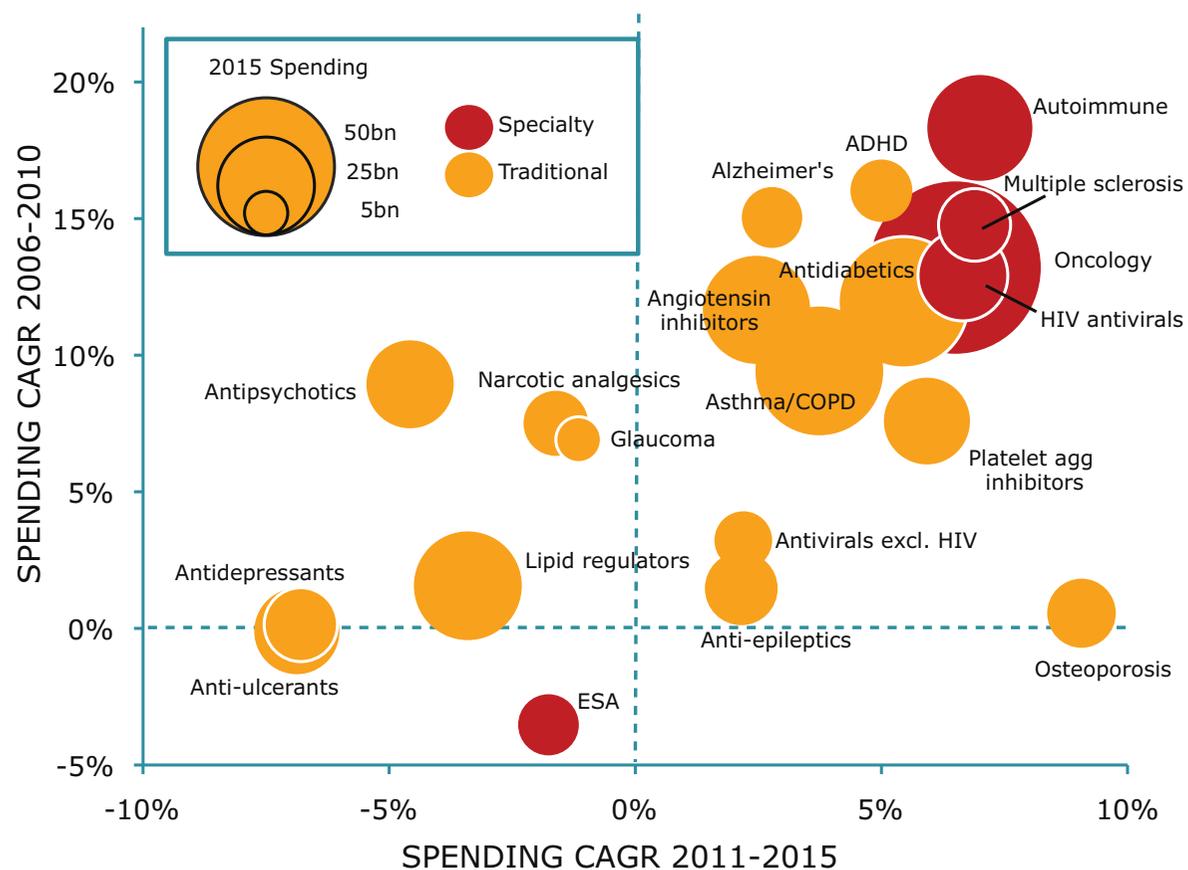
- IMS estimates of total spending are based on IMS audits which do not reflect off-invoice discounts and rebates in most markets.
- The amount of off-invoice discounts in 2010 is estimated to be \$60-65Bn, rising to \$65-75Bn in 2015.
- If the discounts and rebates were fully reflected in our spending estimates, the increase would be \$210-230Bn as opposed to the \$210-240Bn referenced elsewhere in this report.
- Rebate increases driven by commercial considerations are the most significant, are generally paid for protected brands, and cease on patent expiry.
- Public policy practices in the U.S., France and Germany are increasing mandatory rebates while other countries, including Italy and Canada, are banning rebates and implementing more transparent pricing systems.

**Chart notes**

Estimated Net Sales Adjustment is based on a comparison of company reported net sales and IMS reported sales at invoice prices from wholesaler transactions.

# Spending growth on most therapies will be lower through 2015

## Leading Therapy Classes in 2015



- Of the 20 largest therapy classes, spending in 7 will decline over the next five years with only anti-epileptics and osteoporosis growing faster than in the past five years.
- Specialty medicines will experience continued growth in the medium term, driven by novel mechanisms, improved efficacy and relatively large patient populations leading to increased uptake of these high-value medicines.
- Growth is decelerating in most other therapy areas due to patent expiries and the lack of significant new treatment options.

### Chart notes

All spending and growth in US\$ with constant exchange rates. Bubble size reflects 2015 spending.

Specialty therapies are comprised of products with a variety of characteristics including being injectable, high-cost, cold-chain distribution, patient follow-up or monitoring.

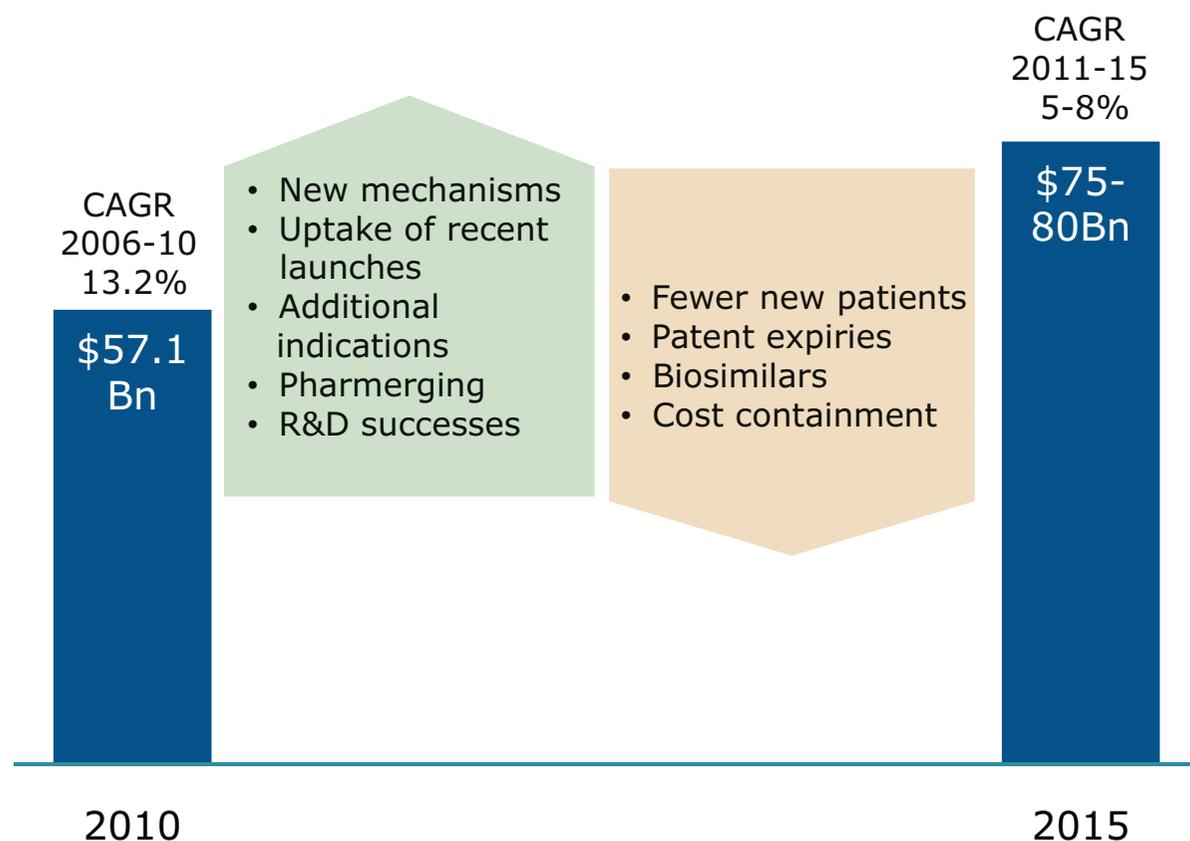
Therapy forecasts for Oncology, Autoimmune, ADHD and Erythropoiesis stimulating agents (ESA) from the IMS Institute for Healthcare Informatics. All other classes from IMS Therapy Forecaster.

Abbreviations: ADHD-Attention Deficit Hyperactivity Disorder; HIV-Human Immunodeficiency Virus; COPD-Chronic Obstructive Pulmonary Disease.

Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

# Global oncology spending will reach \$75Bn by 2015

## Global Oncology Growth to 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

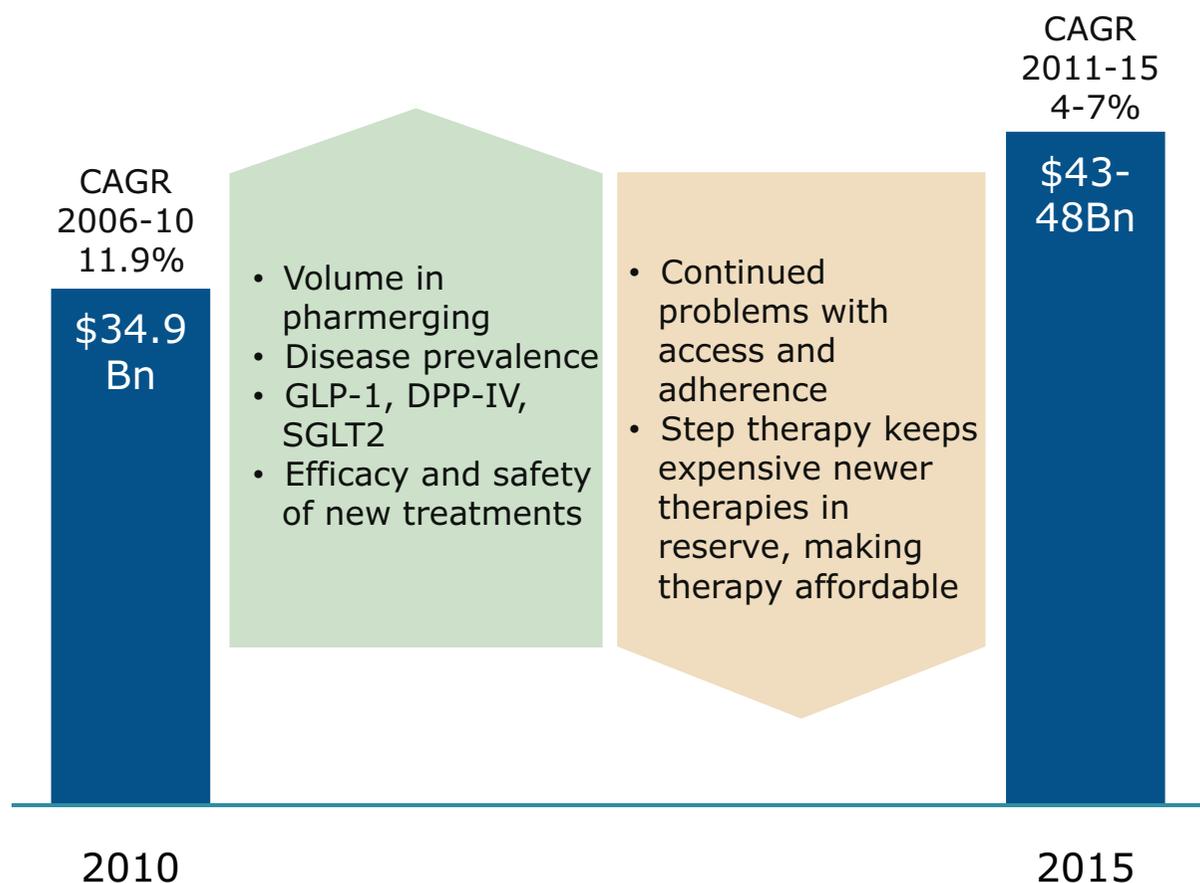
- Existing targeted therapies have already been widely adopted in most developed markets, thereby limiting future new patients and spending growth.
- Current oncology spending of \$9.6Bn will be exposed to generic competition through 2015.
- Cost-containment mechanisms are expected to expand, including higher co-payments in the U.S., HTA-based reimbursement restrictions in Europe, and the approval of biosimilars.
- Growth in pharmerging markets will be lifted by traditional chemotherapy regimens.
- New products with the potential to extend lives will add treatment options in several major tumors, but will not contribute to significantly higher spending.

### Chart notes

All spending and growth in US\$ with constant exchange rates. Oncology includes traditional chemotherapy and hormonal chemotherapy agents as well as targeted therapies. All sales for products whose primary indication is the treatment of cancers including for other uses are included. Supportive care therapies such as anti-nausea, colony stimulating factors (white blood cell boosters) and red blood cell boosters (ESA) are not included.

# Global spending on diabetes will increase by 4-7%

## Global Diabetes Growth to 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

- Growing patient populations, particularly in pharmerging countries such as China, India and Brazil, along with changing lifestyle conditions globally, will increase the prevalence of Type II diabetes.
- Greater use of oral antidiabetic agents is expected due to their convenience and efficacy.
- Complex administration and dosing of insulin products affects compliance and adherence.
- Recent FDA guidance on increased monitoring of cardiovascular and cancer risks has affected the use of marketed drugs and delayed new approvals by requiring additional clinical evidence.

### Chart notes

All spending and growth in US\$ with constant exchange rates.

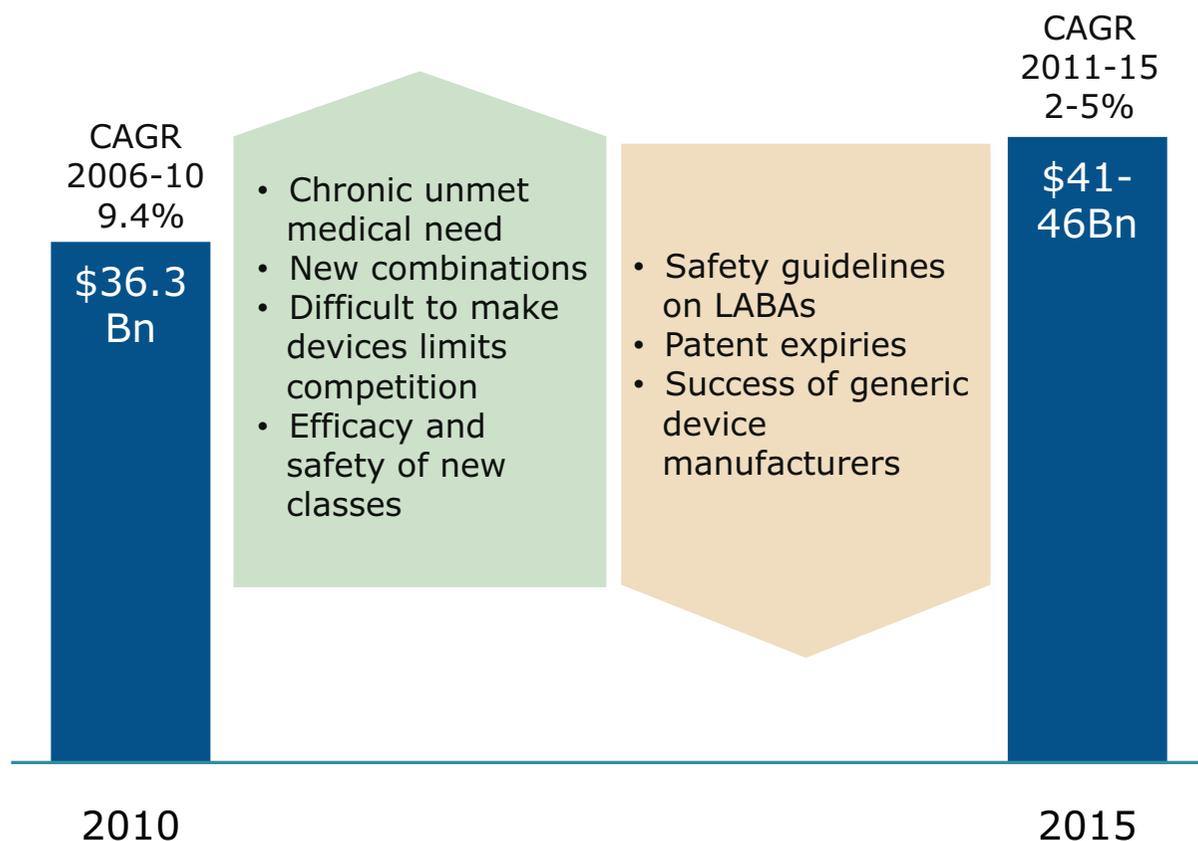
DPP-IV Inhibitor: Dipeptidyl peptidase-4 inhibitor.

GLP-1: Glucagon-like peptide-1.

SGLT2: Sodium glucose co-transporter-2.

# Spending growth slows to 2-5% for asthma and COPD medicines

## Global Asthma/COPD Growth to 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

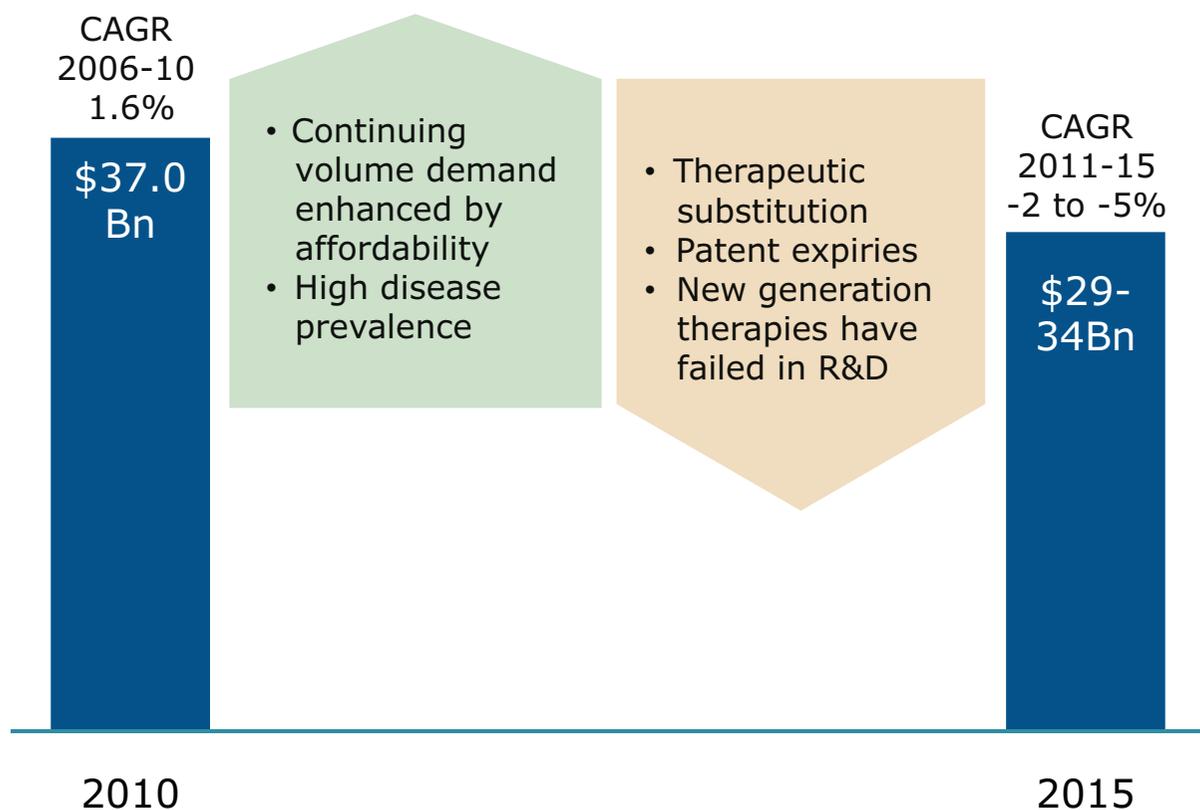
- Long-term use driven by the chronic nature of the asthma and Chronic Obstructive Pulmonary Disease (COPD) will drive spending growth.
- Patients and payers are willing to pay more for effective branded products due to the moderate efficacy of current options.
- Inhaler delivery devices with separate patent protection will continue to minimize direct competition, despite ongoing efforts to develop generics with non-infringing devices.
- Key products exposed to generic competition include Advair<sup>®</sup> Diskus<sup>®</sup>, marketed internationally as Seretide<sup>®</sup>, and Singular<sup>®</sup> which will lose active ingredient patent protection in the U.S. in 2011 and 2012 respectively, but are less likely to face direct competition due to their delivery devices.

### Chart notes

All spending and growth in US\$ with constant exchange rates. Asthma/COPD therapies in this analysis include drugs for Asthma and COPD, but does not include other inhaled or nasal medicines for allergies or allergic rhinitis. LABA: Long Acting Beta Agonists.

# Spending on lipid regulators will decline by 2-5%

## Global Lipid Regulator Growth to 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

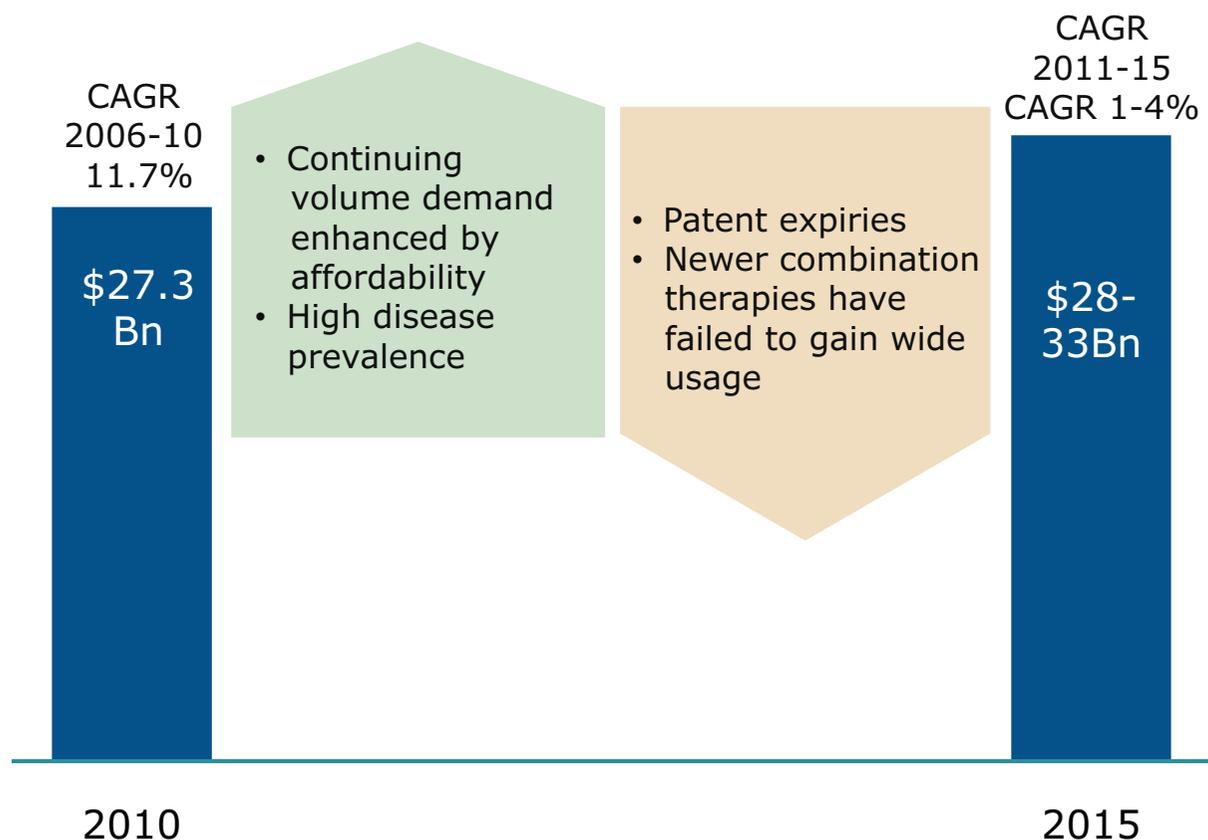
- Global lipid regulator spending will decline as key expiries are expected to impact the class across major markets.
- Lipitor® is expected to face generic competition in the U.S. in 2011.
- Earlier expiries have already shifted a large number of patients to generics, including switching from a branded product to a generic of a different molecule to achieve cost savings.
- Next-generation therapies in the class have generally failed to pass regulatory hurdles and few new branded products are expected in the near term.

### Chart notes

All spending and growth in US\$ with constant exchange rates. Lipid regulators include statins and statin combinations as well as fibrates and other triglyceride regulators.

# Patent expiries slow angiotensin inhibitors growth to 1-4%

## Global Angiotensin Growth to 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

- Historical growth was driven by the better safety and efficacy profile exhibited by ARBs compared to ACE inhibitors and other earlier generation therapies for hypertension.
- New therapies including direct renin inhibitors, and a variety of combinations with existing products, were launched in recent years but have failed to gain wide usage.
- The large and growing patient population worldwide is driving volume growth; however, this will continue to be significantly countered by patent expiries including the current market leader Diovan® which expires in the U.S. in 2012.

### Chart notes

All spending and growth in US\$ with constant exchange rates.

In this analysis, Angiotensin inhibitors include Angiotensin II receptor antagonists (ARBs) whether in plain or combination formulations as well as direct renin inhibitors.

ACE Inhibitors: Angiotensin converting enzyme inhibitors.

## Definitions and conventions:

- This report is based on the IMS products and services detailed in the panel to the right and the research of the IMS Institute for Healthcare Informatics.
- Spending is reported at ex-manufacturer prices and does not reflect off-invoice discounts and rebates.
- Values are converted from local currencies to US\$ using variable exchange rates, except where noted.
- Growth is calculated using US\$ at constant (Q4 2010) exchange rates.
- Products are categorized as brands, generics or other using IMS's proprietary MIDAS™ market segmentation methodology.
- Developed markets are defined as the U.S., Japan, Top 5 Europe countries (Germany, France, Italy, Spain, UK), Canada and South Korea.
- Pharmerging countries are defined as those with >\$1Bn absolute spending growth over 2011-15 and which have GDP per capita of less than \$25,000 on a purchase-price parity basis (PPP). Tier 1: China; Tier 2: Brazil, India, Russia; Tier 3: Mexico, Turkey, Poland, Venezuela, Argentina, Indonesia, South Africa, Thailand, Romania, Egypt, Ukraine, Pakistan and Vietnam.

## NOTES ON SOURCES

**IMS Market Prognosis™** is a comprehensive, strategic market forecasting publication that provides insight to decision makers about the economic and political issues which can affect spending on healthcare globally. It uses econometric modeling from the Economist Intelligence Unit to deliver in-depth analysis at a global, regional and country level about therapy class dynamics, distribution channel changes and brand vs generic product spending.

**IMS MIDAS™** is a unique data platform for assessing worldwide healthcare markets. It integrates IMS national audits into a globally consistent view of the pharmaceutical market, tracking virtually every product in hundreds of therapeutic classes and providing estimated product volumes, trends and market share through retail and non-retail channels. MIDAS data is updated monthly and retains 12 years of history.

**IMS LifeCycle™ R&D Focus™** is a global database for evaluating the market for medicines, covering more than 31,000 drugs in R&D and over 8,900 drugs in active development worldwide. It includes

information about the commercial, scientific and clinical features of the products, analyst predications of future performance, and reference information on their regulatory stage globally.

**IMS LifeCycle™ New Product Focus™** is a comprehensive worldwide tracking service of historical product launches since 1982. It includes information about product launches in each country, including the indication and price at the time of the initial launch, and covers more than 300,000 launches.

**IMS PharmaQuery™** is an online research tool designed to unravel the complexities of pricing and reimbursement in 31 key world markets. It provides detailed information on the rules and regulations, theories and practices, trends and developments, in pricing and reimbursement in both developed and emerging markets.

**IMS Therapy Forecaster™** includes sales and volume forecasts for major therapy areas in 10 key markets, and includes interactive modeling and event-based forecasts and comprehensive market summaries.

# Appendix 1

## Global country rankings

Rank	2005	Index
1	United States	100
2	Japan	36
3	France	14
4	Germany	14
5	Italy	9
6	United Kingdom	7
7	Spain	7
8	Canada	7
9	 China	6
10	 Brazil	5
11	Mexico	4
12	Australia	4
13	Korea	3
14	Turkey	3
15	 India	2
16	 Russia	2
17	Netherlands	2
18	 Belgium	2
19	 Poland	2
20	Greece	2

Rank	2010	Index
1	United States	100
2	Japan	33
3	 China	13
4	Germany	13
5	 France	13
6	 Italy	9
7	 Brazil	8
8	 Spain	7
9	 Canada	7
10	 United Kingdom	7
11	 Russia	4
12	 India	4
13	 Australia	4
14	 Mexico	4
15	 Korea	4
16	 Turkey	4
17	 Poland	2
18	 Netherlands	2
19	 Belgium	2
20	Greece	2

Rank	2015	Index
1	United States	100
2	Japan	36
3	China	31
4	Germany	14
5	France	13
6	 Brazil	12
7	 Italy	9
8	 India	8
9	 Spain	8
10	 Russia	7
11	 Canada	6
12	 United Kingdom	6
13	 Venezuela	6
14	 Turkey	5
15	Korea	5
16	 Australia	4
17	 Mexico	4
18	 Argentina	3
19	 Poland	3
20	 Belgium	2

 Change in ranking over 5 years

Source: IMS Market Prognosis, Apr 2011

### Appendix notes

Ranking in all years based on spending in constant US\$ at Q4 2010 exchange rates.

Index in each year based on ratio of country spending to U.S. sales (in constant US\$) in the year.

## Appendix 2

### Region & leading country spending

US\$ billions	2010	2006-2010 CAGR	2015	2011-2015 CAGR
Global	856.4	6.2%	1065 - 1095	3 - 6%
Developed	587.1	4.2%	630 - 660	1 - 4%
United States	310.6	4.5%	320 - 350	0 - 3%
Japan	96.5	2.6%	110 - 140	2 - 5%
EU5	147.4	4.1%	130 - 160	1 - 4%
Germany	40.5	4.1%	38 - 43	1 - 4%
France	38.0	2.7%	34 - 39	0 - 3%
Italy	26.5	4.5%	24 - 29	1 - 4%
Spain	22.2	6.6%	20 - 25	1 - 4%
United Kingdom	20.2	4.2%	18 - 23	(2) - 1%
Canada	21.5	6.2%	20 - 25	(2) - 1%
South Korea	11.1	10.7%	14 - 19	5 - 8%
Pharmerging	150.5	15.8%	285 - 315	13 - 16%
China	41.1	23.9%	115 - 125	19 - 22%
Tier II	48.8	15.9%	84 - 89	11 - 14%
Brazil	22.9	14.1%	31 - 36	10 - 13%
India	12.3	15.7%	25 - 30	14 - 17%
Russia	13.6	20.0%	23 - 28	11 - 14%
Tier III	60.6	11.8%	89 - 94	10 - 13%
Rest of World	118.8	7.2%	125 - 155	3 - 6%

Source: IMS Market Prognosis, Apr 2011

#### Appendix notes

Spending in US\$ with variable exchange rates.

Compound Annual Growth Rate (CAGR) expressed in US\$ at constant exchange rates.

Tier 3 Pharmerging in descending order: Mexico, Turkey, Poland, Venezuela, Argentina, Indonesia, South Africa, Thailand, Romania, Egypt, Ukraine, Pakistan and Vietnam

## Appendix 3

### Major protection expiries by country and year

Protection expiry year	US		Japan	UK	France	Germany
2011	Lipitor <sup>®</sup> Advair <sup>®</sup> Diskus <sup>®</sup> Zyprexa <sup>®</sup>	Levaquin <sup>®</sup> Xalatan <sup>®</sup> Femara <sup>®</sup>	Actos <sup>®</sup>	Lipitor <sup>®</sup> Zyprexa <sup>®</sup> Clexane <sup>®</sup> Xalatan <sup>®</sup> Femara <sup>®</sup>	Zyprexa <sup>®</sup> Xalatan <sup>®</sup> Femara <sup>®</sup>	Clexane <sup>®</sup> Zyprexa <sup>®</sup> Xalatan <sup>®</sup> Femara <sup>®</sup>
2012	Plavix <sup>®</sup> Seroquel <sup>®</sup> Singulair <sup>®</sup>	Actos <sup>®</sup> Lexapro <sup>®</sup> Diovan <sup>®</sup>	Seroquel <sup>®</sup>	Seroquel <sup>®</sup> Singulair <sup>®</sup>	Singulair <sup>®</sup>	Seroquel <sup>®</sup>
2013	Oxycontin <sup>®</sup> Aciphex <sup>®</sup>	Zometa <sup>®</sup> Xeloda <sup>®</sup>	Aricept <sup>®</sup> Diovan <sup>®</sup> Plavix <sup>®</sup>	Seretide <sup>®</sup> Xeloda <sup>®</sup>	Seretide <sup>®</sup> Xeloda <sup>®</sup>	Xeloda <sup>®</sup>
2014	Nexium <sup>®</sup> Cymbalta <sup>®</sup>	Copaxone <sup>®</sup> Celebrex <sup>®</sup>	Abilify <sup>®</sup>	Abilify <sup>®</sup> Celebrex <sup>®</sup>	Abilify <sup>®</sup> Celebrex <sup>®</sup>	Abilify <sup>®</sup> Celebrex <sup>®</sup>
2015	Abilify <sup>®</sup> Gleevec <sup>®</sup>	Namenda <sup>®</sup>	Alimta <sup>®</sup> Spiriva <sup>®</sup>	Spiriva <sup>®</sup> Alimta <sup>®</sup>	Alimta <sup>®</sup> Spiriva <sup>®</sup>	Spiriva <sup>®</sup> Alimta <sup>®</sup>

Source: IMS Market Prognosis, Apr 2011

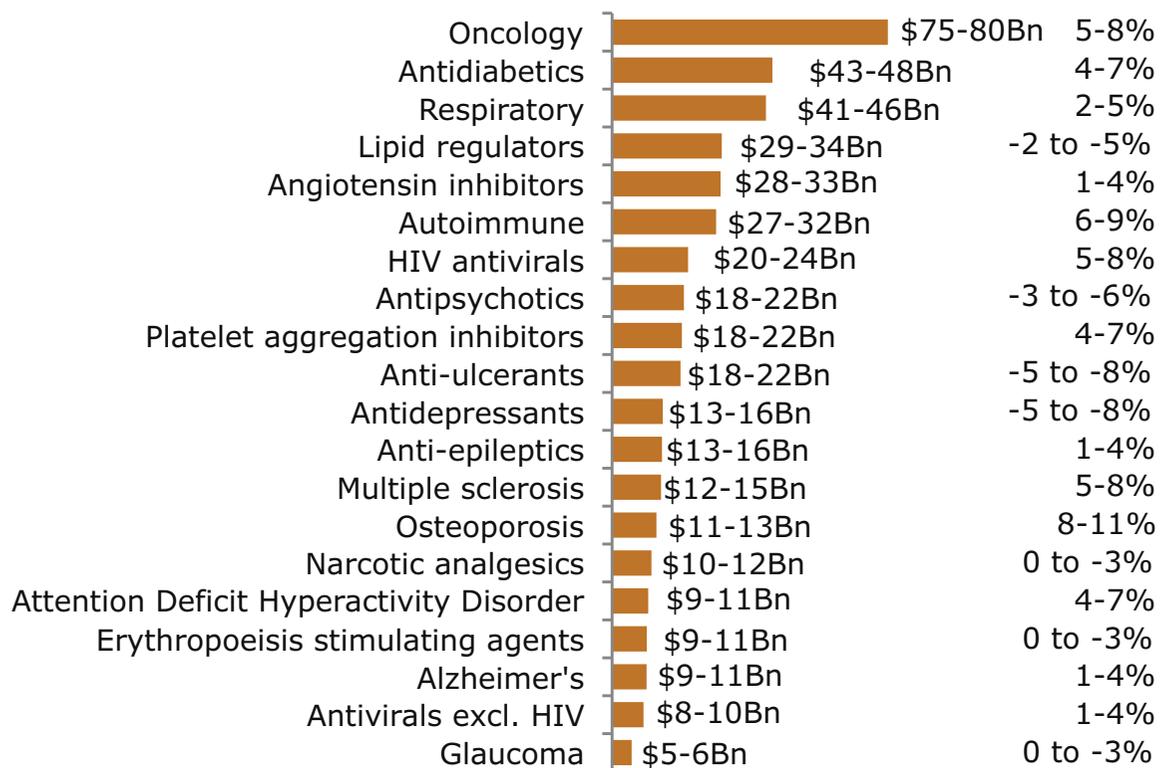
#### Appendix notes

Largest products with protection expiries in the 2011-2015 period listed in descending order by country sales in 2010 in constant US\$ at Q4 2010 exchange rates.

International product names shown except for Advair<sup>®</sup> Diskus<sup>®</sup> in the U.S.

# Appendix 4

## Leading therapy classes in 2015



Source: IMS Institute for Healthcare Informatics; Therapy Forecaster, May 2011

### Appendix notes

All spending and growth in US\$ with constant exchange rates.

## About the Institute

The IMS Institute for Healthcare Informatics leverages collaborative relationships in the public and private sectors to strengthen the vital role of information in advancing healthcare globally. Its mission is to provide key policy setters and decision makers in the global health sector with unique and transformational insights into healthcare dynamics derived from granular analysis of information.

Fulfilling an essential need within healthcare, the Institute delivers objective, relevant insights and research that accelerate understanding and innovation critical to sound decision making and improved patient care.

With access to IMS's extensive global data assets and analytics, the Institute works in tandem with a broad set of healthcare stakeholders, including government agencies, academic institutions, the life sciences industry and payers, to drive a research agenda dedicated to addressing today's healthcare challenges.

By collaborating on research of common interest, it builds on a long-standing and extensive tradition of using IMS information and expertise to support the advancement of evidence-based healthcare around the world.

## RESEARCH AGENDA

*The research agenda for the Institute centers on five areas considered vital to the advancement of healthcare globally:*

Proving the effective **use of information** by healthcare stakeholders globally to improve health outcomes, reduce costs and increase access to available treatments.

Demonstrating the **performance of medical care** to optimize and drive better understanding of disease causes, treatment consequences and measures to improve quality and cost of healthcare delivered to patients.

Understanding the future **global role for biopharmaceuticals**, the dynamics that shape the market and implications for manufacturers, public and private payers, providers, patients, pharmacists and distributors.

Researching the role of **innovation in health system products, processes, and delivery systems**, and the business and policy systems that drive innovation.

Informing and advancing the healthcare agendas in **developing nations** through information and analysis.

## GUIDING PRINCIPLES

*The Institute operates from a set of Guiding Principles:*

The advancement of healthcare globally is a vital, continuous process.

Timely, high-quality and relevant information is critical to sound healthcare decision making.

Insights gained from information and analysis should be made widely available to healthcare stakeholders.

Effective use of information is often complex, requiring unique knowledge and expertise.

The ongoing innovation and reform in all aspects of healthcare requires a dynamic approach to understanding the entire healthcare system.

Personal health information is confidential and patient privacy must be protected.

The private sector has a valuable role to play in collaborating with the public sector related to the use of healthcare data.