IMS INSTITUTE FOR HEALTHCARE INFORMATICS

November 2014

Global Outlook for Medicines Through 2018

Introduction

As global attention turns to the post-2015 development agenda that will replace the United Nations Millennium Development Goals, the role of medicines in supporting the development of healthy societies grows more important. Advances in innovation, efforts to expand access and promote inclusiveness, and new approaches to ensuring the sustainability of healthcare systems will all have a bearing on the use of medicines over the next five years around the world.

In this report we provide an outlook on the use of medicines and spending levels through 2018. We take a global view of the markets for all types of pharmaceuticals, including small and large molecules, brands and generics, those dispensed in retail pharmaceutics as well as those used in hospital or clinic settings. We frame the size of the markets based on pricing information available to us and used to estimate manufacturer sales with a consistent methodology over time. In this report we have also sought to size the magnitude of the impact of various confidential rebates, discounts, taxes or other adjustments that affect the net amounts received by manufacturers.

Over the next five years we expect to see a surge of innovation emerging from the research and development pipeline that will bring clinical benefits to patients not only in developed economies but also in low- and middle-income countries. At the same time, the impact of patent expiries — which has significantly reduced drug spending growth levels across all developed markets in the past five years—will moderate, even with the growing availability of biosimilars. These factors, combined with the expected strengthening of the global economy and rapid expansion of access in emerging markets, will drive higher levels of growth in drug spending over the next five years compared to the past five years. They will also result in medicines playing a more central role in the timely and cost-effective prevention or treatment of disease, helping to bring lower costs to health systems overall even as patient outcomes and satisfaction can improve. We will continue to monitor these developments closely and provide additional insight regularly.

This study was produced independently by the IMS Institute for Healthcare Informatics as a public service and without industry or government funding. The contributions to this report of Kim Tempas, Abasi Ene-Obong, the IMS forecasting team and many others at IMS Health are gratefully acknowledged.

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Executive Summary

Global spending on medicines is forecast to reach nearly $1.3 trillion by 2018, an increase of about 30% over the 2013 level. This level of growth—a compound annual growth rate of 4-7% on a constant currency basis—will be slightly higher than the 5.2% recorded over the past five years, as the introduction of new specialty medicines and increased accessibility for patients coincides with lower impacts from patent expiries in developed markets.

Annual spending growth will spike in 2014 when absolute growth will be about $70 billion, up from $40 billion growth in 2013. Thereafter, growth will moderate though remain at higher levels than seen in the past five years. The developed markets—led by the United States, the major five European markets and Japan—are the primary drivers of this increased growth, while the 21 pharmerging countries will increase their contribution to growth over the next five years and account for nearly 50% of absolute growth in 2018.

While the level of global spending is based on best available pricing information and measured at the ex-manufacturer level, it does not factor in a range of rebates, discounts, taxes and other adjustments that affect the net amount received by manufacturers. These result from regulations as well as competitive negotiations between suppliers and purchasers. These are expected to increase in aggregate over time and therefore reduce the level of growth incorporated in this forecast. This impact is estimated to be approximately 25% of the total growth over the next five years, and suggests the net price growth rate will be about one-half percentage point lower than reflected in this report.

Among the major markets, the United States remains the largest, representing over one-third of the global total, and is expected to grow at a compound annual growth rate of 5-8% through 2018. This is significantly higher than the 3.6% growth over the past five years, and is particularly dramatic in 2014 when market growth is expected to reach 11.7%. While growth will moderate from that level in 2015 and be in the 5% range thereafter, this is a reflection of a shift in the balance of the "innovation cycle"—the amount of new medicines being launched and utilized compared to the value of branded medicines that are facing

new generic competition. In 2014 for example, an unusually high level of spending on new products is coinciding with an unusually low reduction in the use of brands associated with new generic entrants. Price increases also contribute to U.S. market growth, unlike other countries, though much of these increases are not realized by manufacturers due to rebates and discounts. Implementation of the Affordable Care Act and the resulting expansion of access will result in slightly higher levels of growth, though the impact of other structural changes of healthcare payment and delivery will be more significant.

Across the major markets in Europe, economic austerity–led efforts to constrain growth in healthcare spending, and especially medicines, have resulted in spending declines or very low growth, which will continue through 2018. Japan, similarly, is forecast to see growth in the 1-4% range even as its population over the age of 65 exceeds 27%, 5% higher than other developed countries, and is expected to increase demand for medicines.

The pharmerging markets will expand at a compound annual growth rate of 8-11% through 2018, a slower pace than over the past five years, which averaged 13.6% growth. China, already the world's second largest pharmaceutical market, will reach spending levels of $155-185 billion in 2018. Implementation of health reforms are increasing demand for medicines, while pricing regulations are being used more frequently to manage overall growth levels. Over 80% of growth in pharmerging markets will be attributed to non-branded medicines.

Higher spending can be expected on specialty medicines over the next five years, particularly in developed markets. About 40% of total global growth will come from these medicines, primarily in the oncology, autoimmune, respiratory, anti-virals and immunosuppressants therapy areas. Much of this growth is from medicines bringing new treatment options for patients, including breakthrough therapies or even cures, and often reduced complications or hospitalizations. A growing number of these drugs are also available in oral form, which reduces the costs associated with delivering the drug to patients. The pipeline of innovative specialty drugs is also robust, especially in the area of oncology, and the number of new molecular entities that will be launched is expected to remain at levels higher than in the past decade, aided by an increasing number of applications subject to accelerated regulatory review.

Over the next five years, advances in the therapy areas of oncology, diabetes and hepatitis C will be of particular interest and importance. The surge in cancer drug innovation over recent years will continue and contribute to global spending on all oncology drugs, reaching about $100 billion in 2018, up from $65 billion last year. A number of new immunotherapies will become important parts of the cancer treatment arsenal, including PD-1 and CDK inhibitors. Spending on diabetes treatments will exceed $78 billion globally in 2018 as growth moderates. Although prevalence of diabetes continues to accelerate, particularly in low- and middle-income countries, treatment costs overall will increase more modestly as biosimilar insulins become available and payer pressure on higher-priced treatment options intensifies. The introduction and uptake of potent new medicines for the de facto cure of hepatitis C are expected to result in about $100 billion in total spending over the five-year period ending 2018. A large number of individiual and combination drugs are already available or in late-stage development, bringing remarkable clinical benefits to those patients able to access them. At the same time, payers struggle with the challenges of financing the upfront costs of these drugs, even though they can bring economic savings over the long term.

The dynamics resulting from changes in the role of medicines in healthcare systems and the associated level of spending differ significantly over time and across countries. The impact of the drivers of the innovation lifecycle, the growing focus on outcomes and performance measures in healthcare, and the pursuit of universal health coverage are playing out in significant ways around the world. With almost $1.3 trillion in spending on medicines expected in 2018, the focus on the value provided by medicines as an integral part of prevention and treatment has never been more important—to patients, healthcare professionals and payers alike.

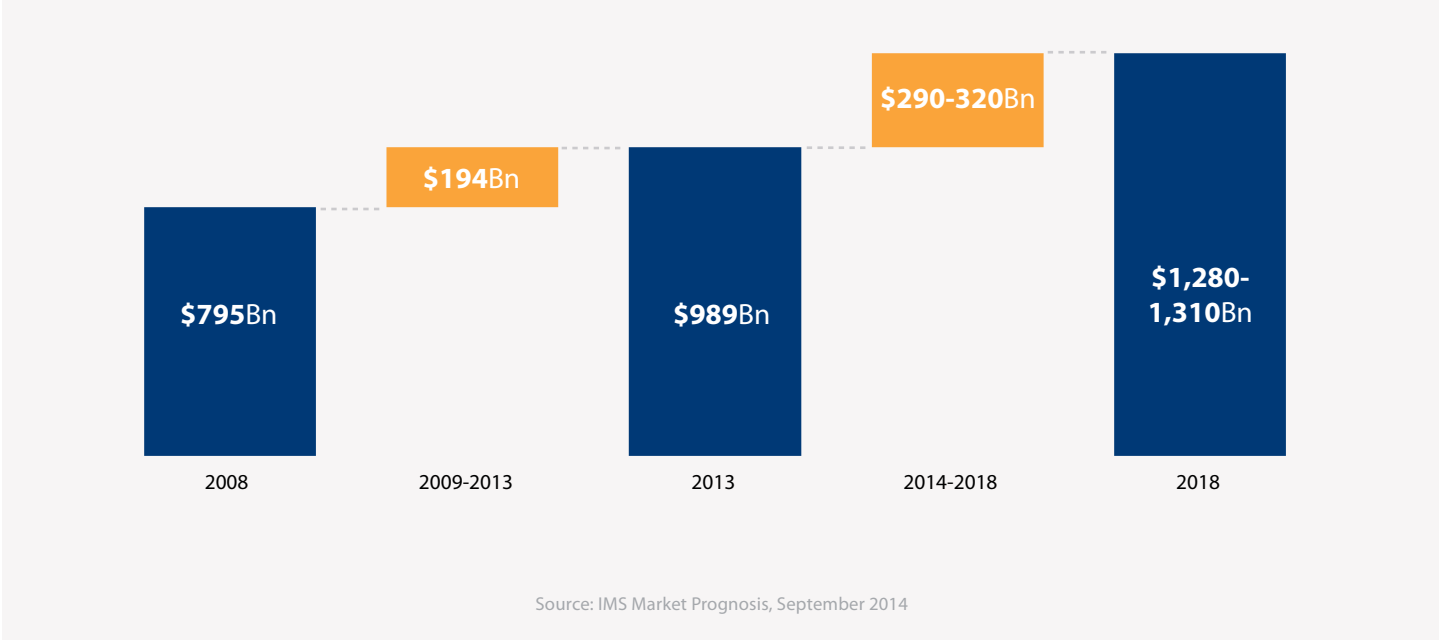
Global spending on medicines

Total global spending will reach $1.3Tn in 2018, an increase of $290-320Bn from 2013, driven by population growth, an aging population, and improved access in pharmerging markets.

- Of developed markets, the U.S. will see the largest per capita spending increase from 2013 to 2018, while other developed countries such as France and Spain will see a decrease due to implementation of policies to control spending growth.
- Global spending growth will peak in 2014-15 and will moderate through 2018, due to fewer patent expiries, launches of more innovative medicines and price increases.
- Off-invoice rebates and discounts will help decrease net sales growth in both developed and pharmerging markets through 2018.
- Global spending growth will stabilize between 4-7% through 2018.

The global pharmaceutical market is expected to grow to nearly $1.3 trillion by 2018

Global spending and growth, 2008-2018



Source: IMS Market Prognosis, September 2014

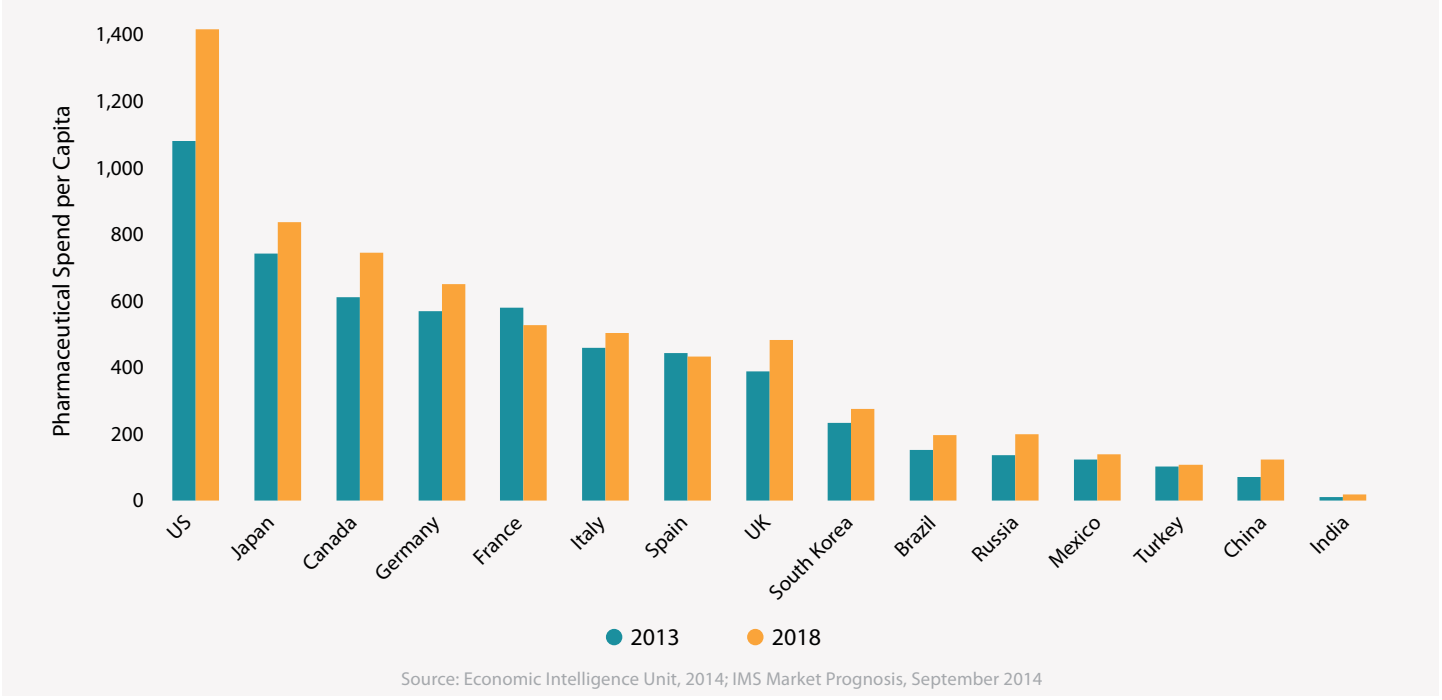
- Spending on medicines globally is expected to reach nearly $1.3Tn by 2018.
- Using actual and forecast exchange rates, the absolute global spend for pharmaceuticals will change by $290-320Bn, compared to $194Bn in the past five years; using constant exchange rates, absolute growth is expected to be $305-335Bn, compared to $219Bn in the prior five years.
- Global economic recovery continued in 2013 and is expected to strengthen during the first half of the forecast period.
- Significant downside risks remain however, due to uneven economic recovery in Europe, political tension in Russia and recent events in Africa and the Middle East.
- The global population aged 65 and over will grow faster than any other age segment, and will account for almost 30% of overall population growth in the next five years.
- Demographic trends will act as a significant driver of global demand for pharmaceuticals during the next five years: increase in diagnosis and treatment of chronic conditions and an aging population will drive developed markets, while population growth coupled with improved access to healthcare will drive emerging market growth.

Chart notes:

Spending in US$ with variable exchange rates. Charted growth from 2008-13 and 2014-18 include impacts of exchange rate variability.
In 2008-13, exchange rates contributed approximately -$25Bn to growth. In 2014-18, they are expected to contribute approximately -$18Bn.

Most countries will experience an increase in pharmaceutical spending per capita by 2018

Pharmaceutical spending per capita, 2013 versus 2018



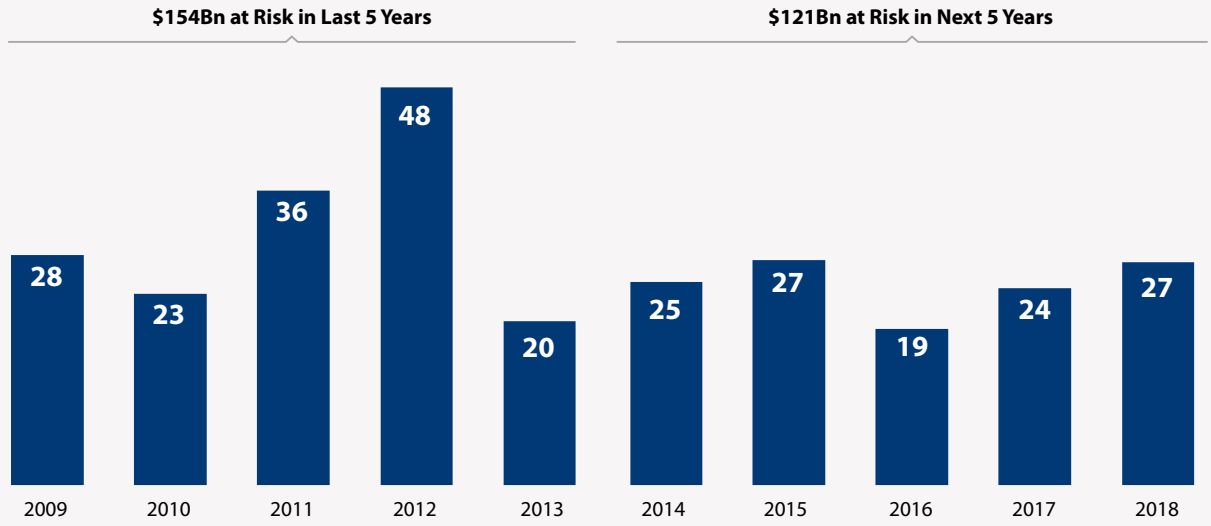
Source: Economic Intelligence Unit, 2014; IMS Market Prognosis, September 2014

- Growth in the U.S. market will remain strong, disproportionate to its population growth; this is driven by fewer patent expiries than in previous years, innovative product launches and rising prices.
- Despite high growth in pharmerging countries, there remains a large difference in pharmaceutical spending per capita versus developed markets.
- Only France and Spain will see a contraction of pharmaceutical spend per capita in 2018, due to policies intended to control spending growth.
- Highest growth is anticipated in China, where per capita spending is anticipated to grow by over 70% in the next five years.
- As the second largest market in the world, China's spend is expected to be just 9% per capita of that in the U.S.

Chart notes:
Spending used to calculate spend per capita in US$ at actual and forecasted variable exchange rates.

Small molecule patent expiries will moderate through 2018 after a peak in 2012

Value of small molecule products facing loss of exclusivity in developed markets



Source: IMS MIDAS, June 2014

- In the last five years, the value of small molecule products facing loss of exclusivity in developed markets totaled $154Bn.
- The patent cliff peaked in 2011-12 when Lipitor, Plavix, Singulair and Seroquel faced generic competition in the U.S. for the first time.
- Global brands such as Nexium, Celebrex, Symbicort, Abilify, Gleevec, Crestor, Zytiga and Cialis face patent expiry in the next five years.
- While a further $48Bn of spending for biologic medicines will lose exclusivity in the next five years, gradual evolution of biosimilar regulations and competition will result in less impact on brands than is typically seen with small molecules.[1]

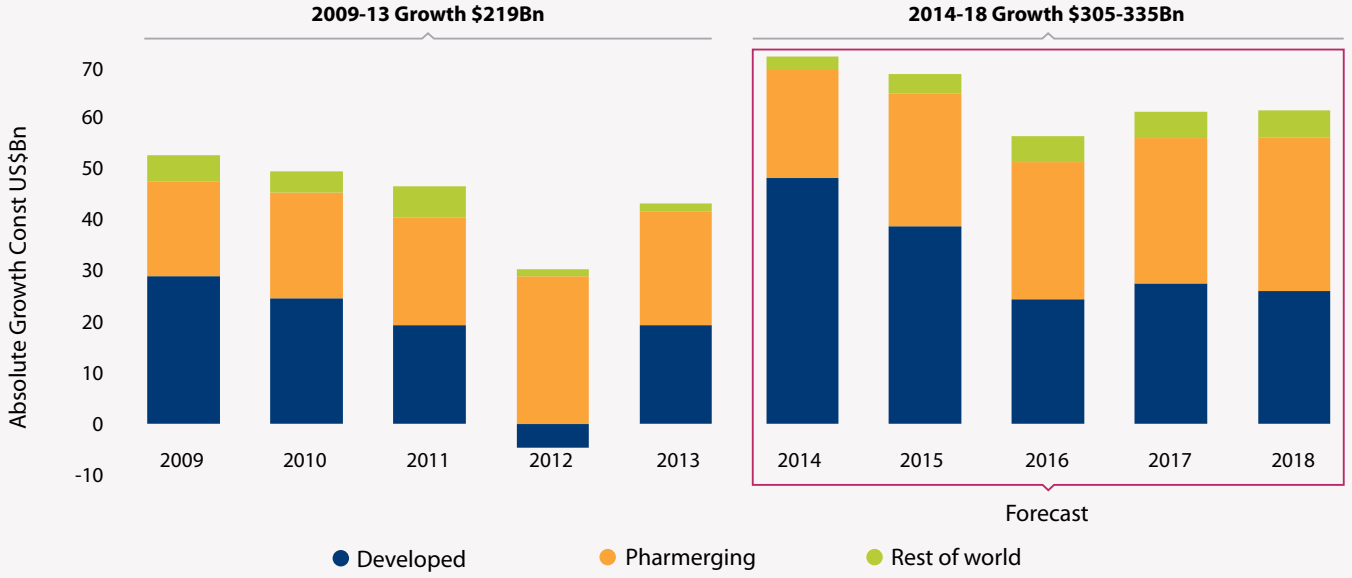
Chart notes:

[1]Assessing biosimilar uptake and competition in European markets, IMS Institute for Health Informatics, October 2014.

Sales in year prior to patent expiry used for products that went off patent between 2009-14. Sales in MAT June 2014 used to estimate value of products at risk to patent expiry 2015-18. Current value of originator sales is not an estimate of future sales losses nor a prediction of future generic sales.

Annual global spending growth will spike in 2014-2015 and moderate through 2018

Global growth, 2009-2018



Source: IMS Market Prognosis, September 2014

- In 2014, developed markets will see strong growth due to fewer patent expiries, the launch of innovative medicines and price increases.
- The increased contribution to growth from developed countries seen through 2018 is led by the U.S. and Japan, with EU5 (Germany, France, Italy, Spain and U.K.) maintaining relatively low levels of growth.
- Growth in developed markets will moderate; with patent expiries and pharmaceutical cost-containment measures expected to limit prices, rising volumes will be a significant contributor to overall market growth.
- Largely driven by China, which represents 46% of the pharmerging market, growth in pharmerging markets will continue, driven by improved access and population increases, but will moderate in the latter years of the forecast.

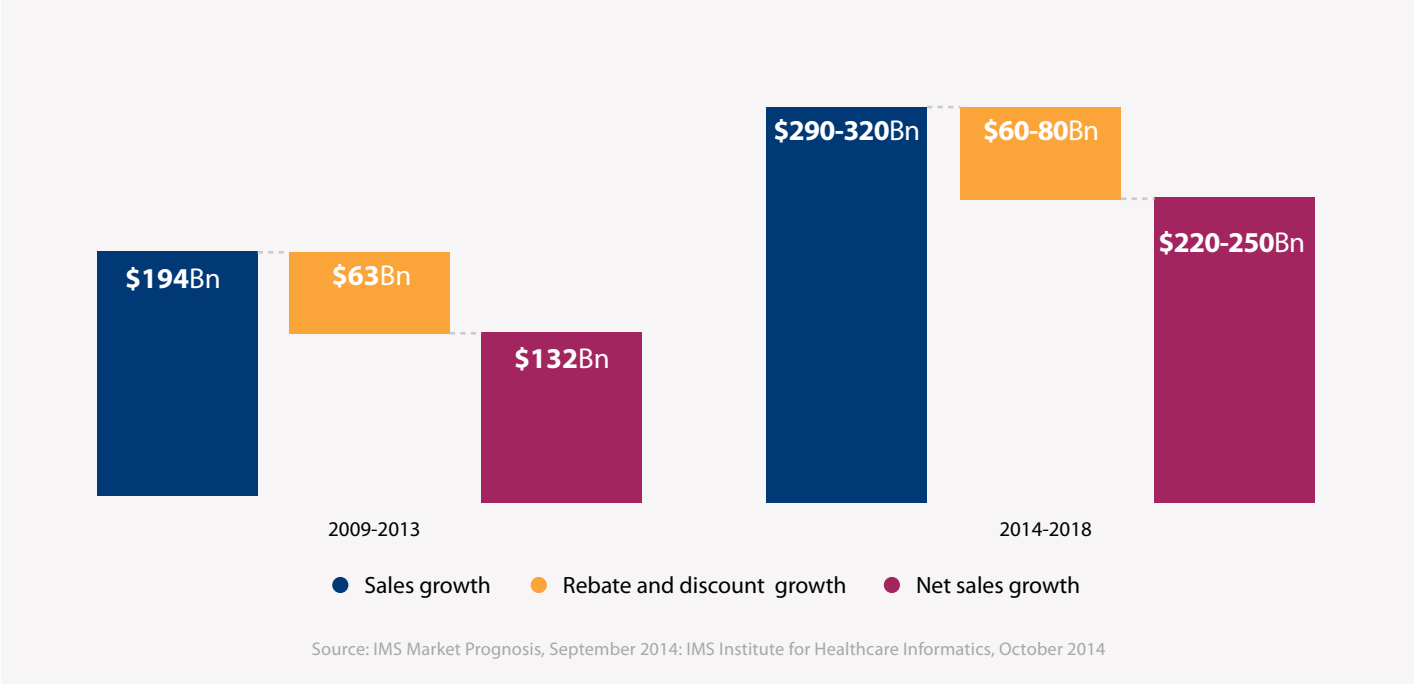
Chart notes:

Developed: U.S., Japan, Germany, France, Italy, Spain, U.K., Canada, South Korea. Pharmerging: China, Brazil, Russia, India, Algeria, Argentina, Colombia, Egypt, Indonesia, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam.

Absolute growth in constant US$, excludes the impact of exchange rate changes, which are expected to have approximately -$18Bn impact by 2018.

Off-invoice rebates and discounts will reduce net manufacturer sales growth by approximately 25%

Global market growth moderated by rebates 2009-2013 and 2014-2018



Source: IMS Market Prognosis, September 2014: IMS Institute for Healthcare Informatics, October 2014

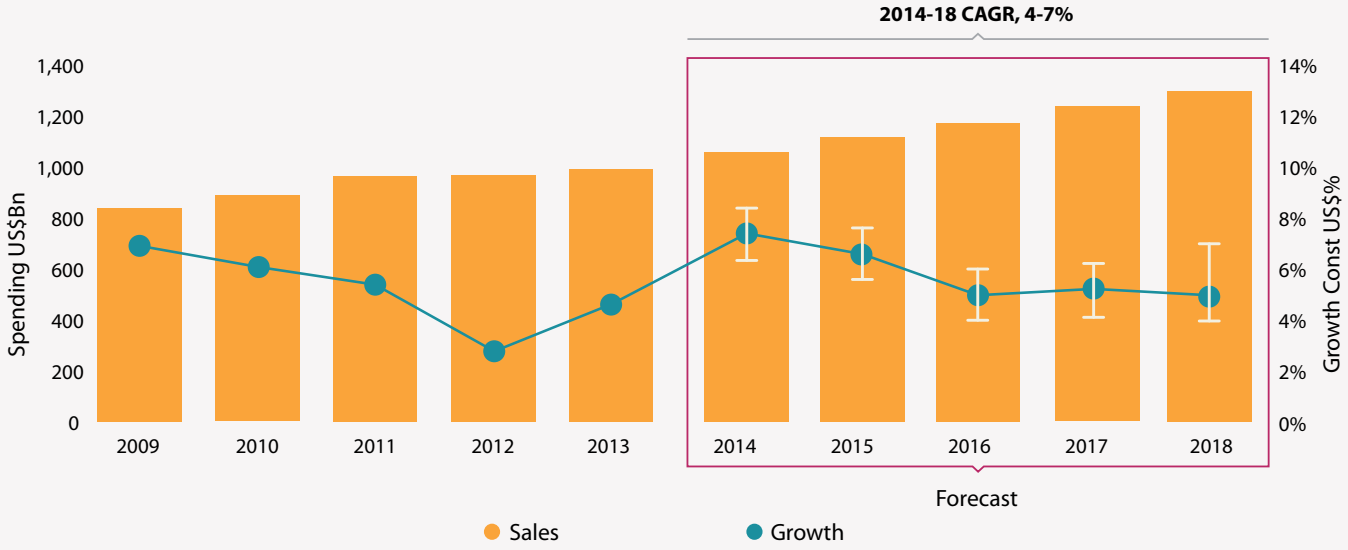
- Off-invoice discounts and rebates moderate the growth of the global market through 2018 but are not reflected in IMS forecasts; the global CAGR net of discounts and rebates is estimated to be 0.5% lower than IMS' forecast.
- Cost-containment policies in developed and pharmerging markets alike are increasingly driving price concessions, often through off-invoice discounts and rebates.
- Increases in negotiated discounts are counteracting list price increases, and populations aging into public pay systems may have a higher level of negotiated rebates.
- Influencing this trend are government-mandated rebates and new caps instituted on total levels of public drug spend combined with manufacturer payback arrangements in some countries.
- Price concessions for branded products are expected to increase through 2018 and those for generics also are expected to grow as generics companies compete with increasing intensity.

Chart notes:

Estimated net spending adjustment is based on a comparison of company-reported net sales and IMS-reported sales in the U.S., and investigation and modeling of government-mandated or commercially driven supply chain discounts and rebates in other countries. IMS estimates of total spending are based on IMS audits, most often collected at invoice prices from wholesaler transactions and which do not reflect off-invoice discounts and rebates in most markets.

Global spending growth will peak in 2014 at 7%, 4-7% CAGR through 2018

Global spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

- Global growth will peak at 7% in 2014, the highest growth since 2004 when it was 7.7%.
- Strengthening of the global economy, fewer patent expiries in developed markets, new medicines and growth in pharmerging markets will contribute to a CAGR of 4-7% through 2018.
- Growth will peak in 2014, driven predominately by the U.S. market, which is forecast to grow 11-13% in 2014 and moderate to 5-8% CAGR through 2018.
- Price increases, mostly in the U.S., contributed to growth in 2014, driven by some specific products and therapy areas where list price increases were above historic norms, and are expected to moderate through the rest of the forecast back to historic levels and be offset by off-invoice discounts and rebates, which are not reflected here.

Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy, mail-order, long-term care and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health. The unaudited share of the market is assumed to remain constant for the duration of the forecasting period.
Spending in US$ with variable exchange rates. Growth in US$ at constant exchange rates.

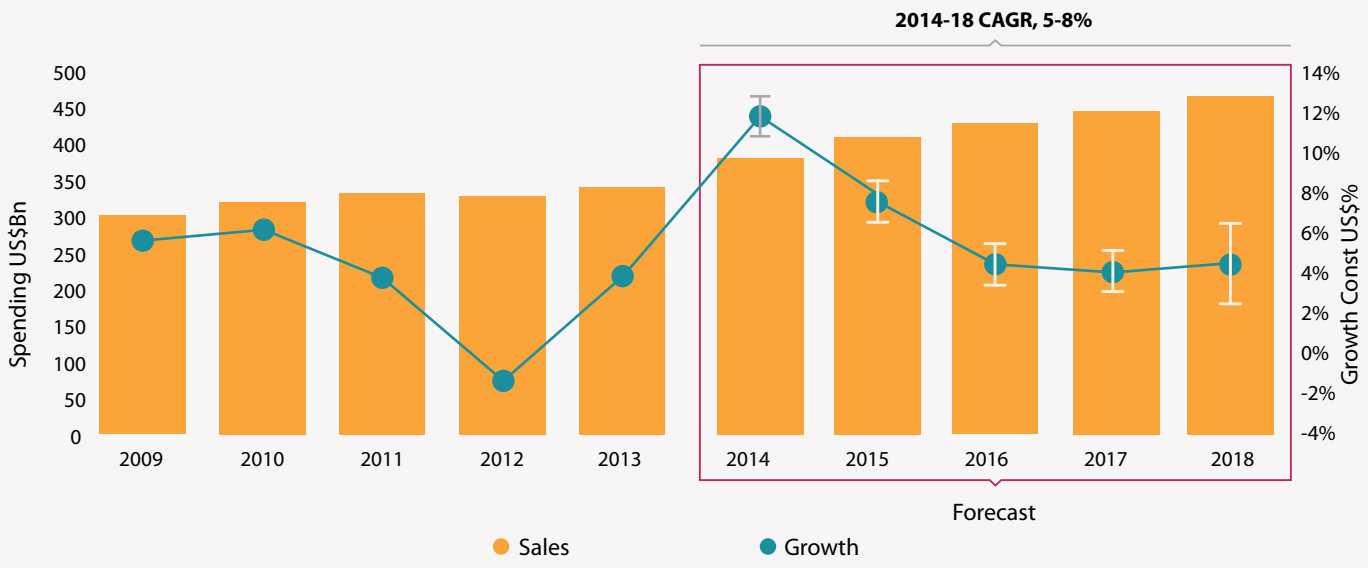
Key Countries

Strong initial growth will moderate over the forecast period, with different factors driving growth in each region.

- In each of these countries, some uncertainty exists in forecasting future spending on medicines in 2018, primarily related to macroeconomic factors and the impact of evolving healthcare reforms:
    - In the U.S., the largest impact on spending growth will be less impact from patent expiries, further implementation of the Affordable Care Act, an aging population and price increases.
    - In the EU5 countries, growth will be flat following recovery from the recession, and will be influenced greatly by changes to discounts and price cuts in certain countries.
    - In Japan, growth will peak early and then moderate, strengthened by growth in new medicines and moderated by price reductions due to competition in post-expiry branded drugs.
    - In China, high growth of the past is expected to slow down and stabilize through 2018, driven by improvements to healthcare infrastructure, increased access to medicines and an increasing number of private hospitals.
- In pharmerging countries, spending growth will be between 8-11%, an increasing share of the global market, bolstered by population growth, increased access to new medicines and health care, and government-funded economic stimulus programs.
    - Growth in pharmerging countries will be heavily driven by generic and non-branded products, growing at double the rate of branded growth.
- North America continues to contribute the largest proportion to growth, but Asia will have the largest growth in global market share.
- Generics are the largest driver of growth globally, and are the largest contributor in Latin America and smallest contributor in North America.
- Specialty medicines are larger drivers of spending growth in developed regions such as North American and Europe than in pharmerging regions.

U.S. spending growth on medicines will peak in 2014 and then moderates through 2018

U.S. spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

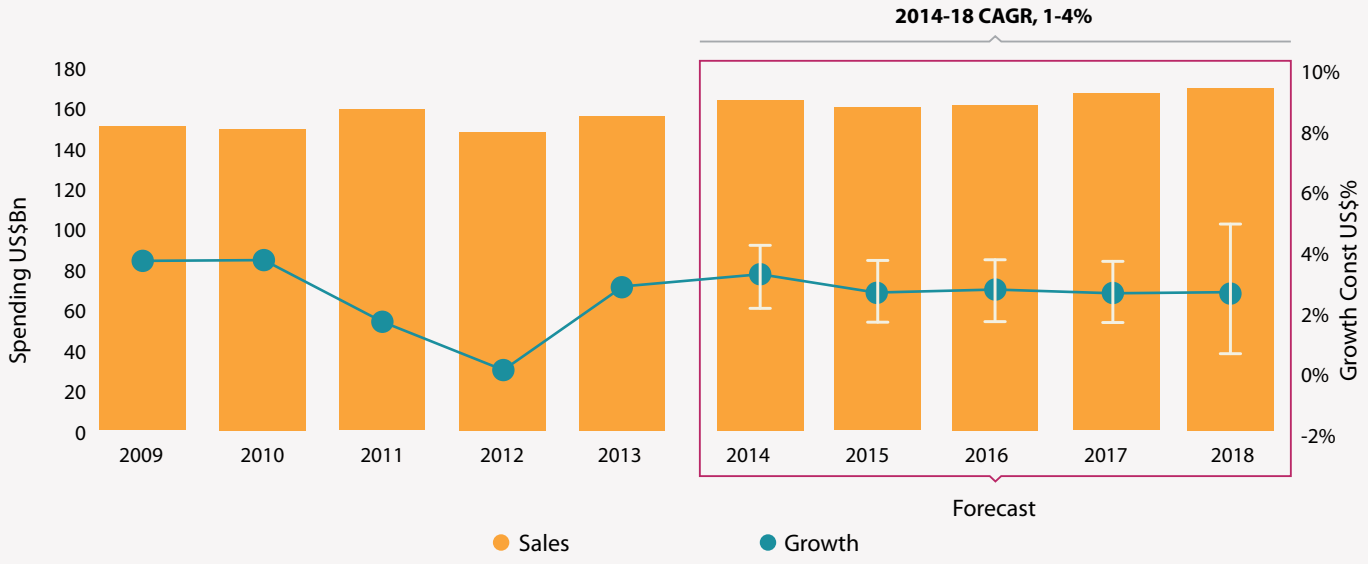
- The U.S. market will see dramatic growth in 2014, due to the launch of innovative products, lower impact from patent expirations and price increases that are partially offset by rebates and discounts and are not reflected in the forecasts.
- The implementation of the Affordable Care Act will have a positive impact on demand for medicines during the first half of the forecast period due to expanded enrollment in state Medicaid programs and increased use of tax credits to purchase private health insurance.
- However, expanded coverage will increase budgetary pressure on payers, with drug spending being a popular target for cost containment.
- Biosimilars will target a limited number of originator molecules during the forecast period, and contribute to lower medicine spending for those medicines, while biologics' spending will continue to grow faster than medicines overall, driven by innovation.

Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy, mail-order, long-term care and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health. The unaudited share of the market is assumed to remain constant for the duration of the forecasting period. Spending in US$ with variable exchange rates. Growth in US$ at constant exchange rates.

Top 5 European markets spending growth will be flat through 2018

Top 5 Europe spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

- Europe has emerged from recession, but recovery across the region has been uneven, with high unemployment and large debt burdens yet to be addressed.
- Healthcare budgets across much of the region remain under pressure from austerity measures.
- The highest growth will be in Germany and the U.K., boosted by a reduction in mandatory discounts in Germany and National Health Service (NHS) budget easing in the U.K.
- France and Spain will see zero to negative growth, due to price cuts and increased generic utilization in France, and changes to the reference pricing system in Spain.

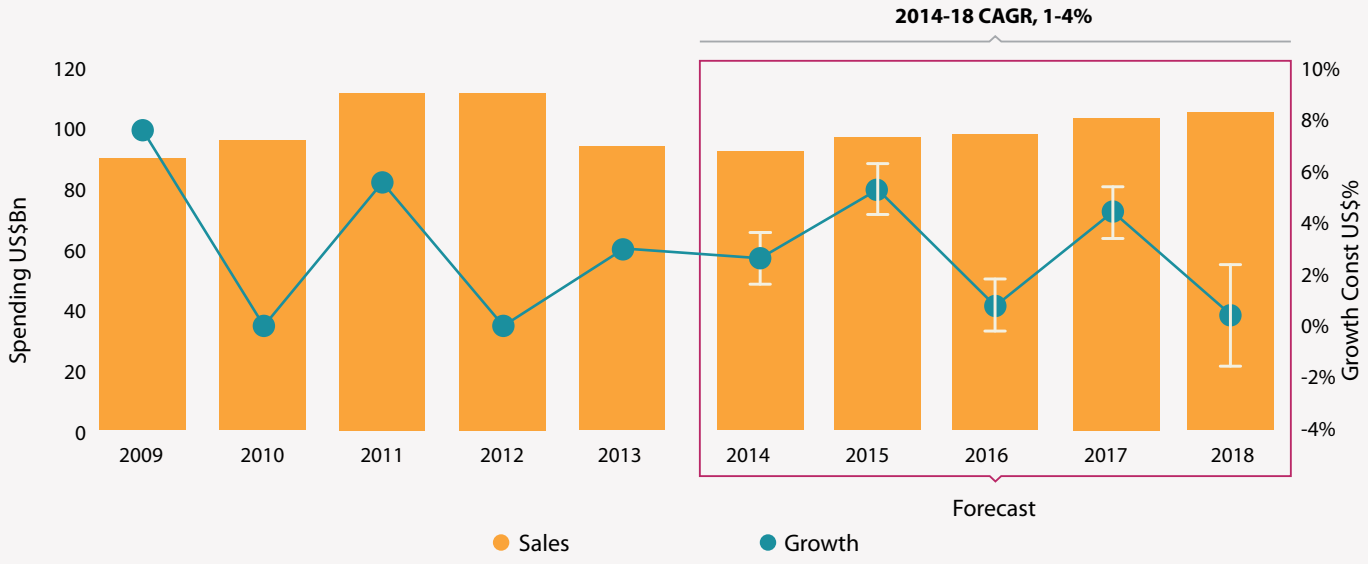
Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health.

The unaudited share of the market is assumed to remain constant for the duration of the forecasting period. Spending in US$ with variable exchange rates. Growth in US$ at constant exchange rates.

Japan's growth is expected to return to historic patterns through 2018 after atypical 2014

Japan spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

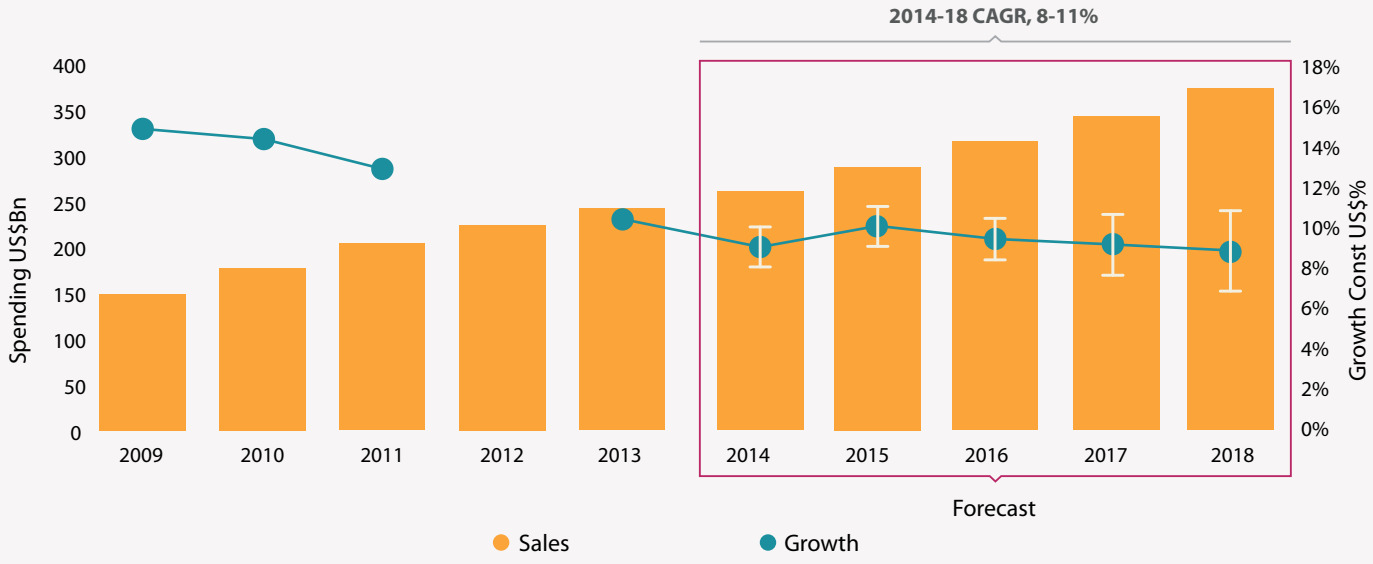
- In 2014, scheduled average price cuts of 5-6% were offset by simultaneous value-added tax (VAT) increases of nearly 3%, and market growth was boosted by stockpiling prior to the VAT implementation resulting in growth higher than a typical price-cut year.
- Innovative medicines will be a key driver of growth as manufacturers are insulated from biennial price cuts in return for new drug development as part of reforms implemented in 2010.
- Steep reductions in branded drug pricing post-expiry and intensifying pressure on generic prices are also intended to reduce spend.
- Generic utilization remains low by international standards, but is slowly increasing due to policies and financial incentives aimed at doubling generic usage by 2018.
- Price cuts will deliver substantial cost reduction but the market will still grow 1-4%.
- While the population as a whole will decline, the number of retirees —already accounting for a quarter of all patients in Japan —continues to increase and is expected to drive up demand for medicines.

Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health. The unaudited share of the market is assumed to remain constant for the duration of the forecasting period. Spending in US$ with variable exchange rates. Growth in US$ at constant exchange rates.

Pharmerging growth steady with greater access to medicines and economic improvement increases

Pharmerging markets spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

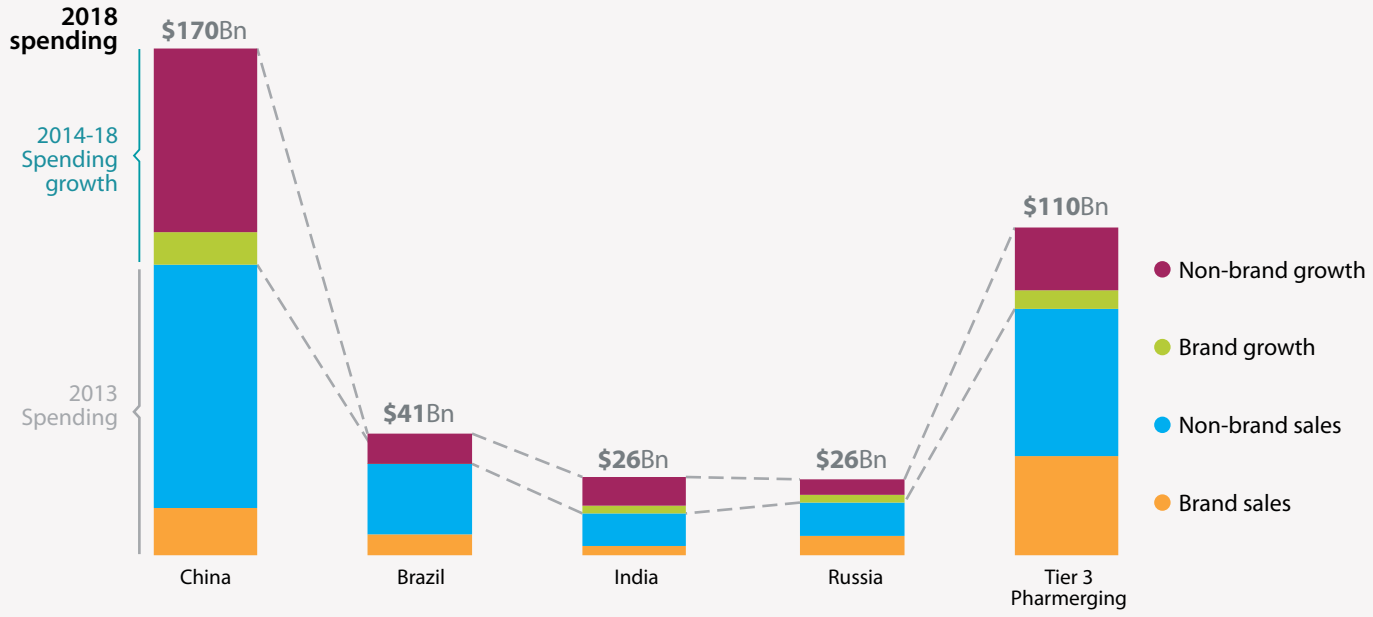
- Spending on medicines in pharmerging economies, especially those in Asia, will be boosted by a combination of rapid population growth due to falling infant mortality rates and increased longevity, along with improved access to subsidized healthcare.
- Additional growth in demand for medicines is expected as incomes rise.
- The result of strong growth in pharmerging economies, plus slowed growth in other regions will also cause pharmerging countries to account for a growing share of global sales.
- As growth in developed markets resumes, increasing global demand and expanding global export markets will benefit the pharmerging countries; however, these economies remain vulnerable to downside risks from advanced nations and may be notably affected by slow European growth.
- Government stimulus and investment projects across pharmerging economies will contribute to domestic demand overall with downstream effects on the demand for medicines.

Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health.
The unaudited share of the market is assumed to remain constant for the duration of the forecasting period. Spending in US$ with variable exchange rates. Growth in US$ with constant exchange rates. Pharmerging: China, Brazil, Russia, India, Algeria, Argentina, Colombia, Egypt, Indonesia, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam. 2012 year growth rates reflect a trend break due to audit improvement in China.

Pharmerging market growth is driven by generics and non-branded products

Pharmerging spending and growth 2013-2018



Source: IMS Market Prognosis, September 2014; IMS Institute for Healthcare Informatics, October 2014

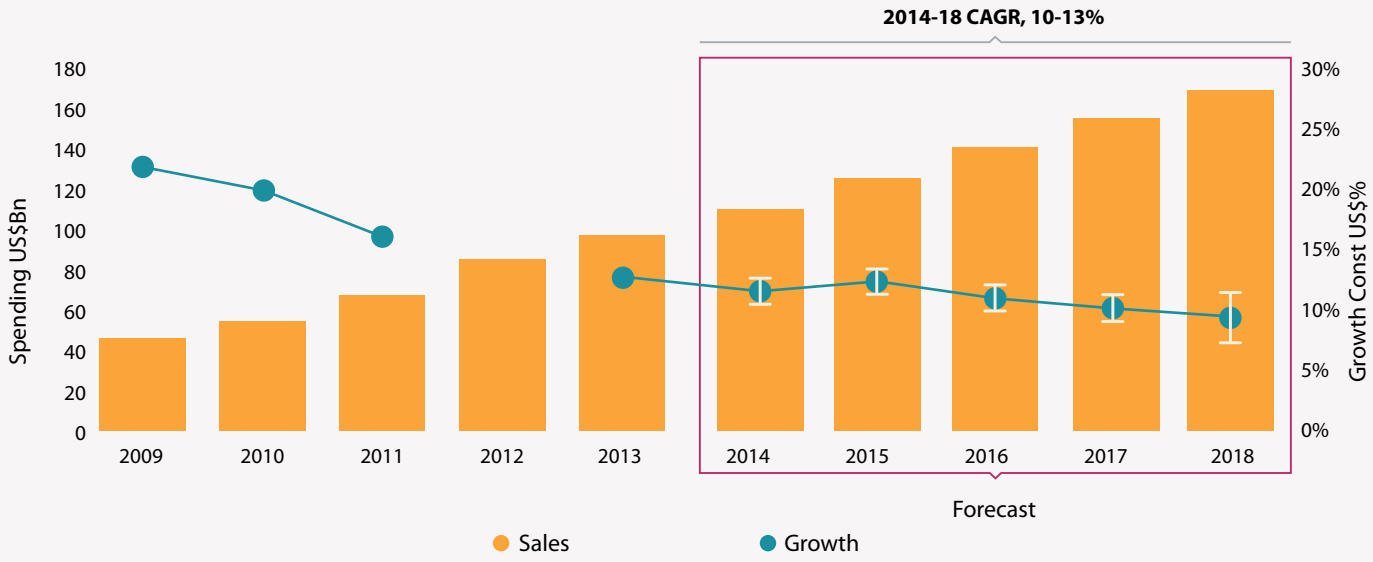
- Growth in pharmerging markets is comprised of 83% non-brand medicine growth, driven mostly by growth in generics.
- China demonstrates 75% total growth in the next five years, driven by both brands (70% growth) and non-brands (75% growth).
- While some pharmerging markets have robust domestic generic industries, other typically smaller countries rely more on the import of medicines and tend to have higher branded medicine spending as a share of their total spend.
- As a percentage of total growth in pharmerging markets, brand growth remains steady at 30% growth while non-brand growth sharply increases at 61%.
- Brand growth comprises 23% of total growth for Tier 3 pharmerging markets primarily due to significant importation of medicines and pricing policies that promote competition.
- Government pricing policies are typically restrictive, including price controls, driving brand prices to competitive levels and limiting price growth.

Chart notes:

Spending and growth in US$ with variable exchange rates. Brands defined using IMS's proprietary market segmentation methodology. Tier 3 Pharmerging : Algeria, Argentina, Colombia, Egypt, Indonesia, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam.

China's growth is expected to slow down and stabilize through 2018

China spending and growth, 2009-2018



Source: IMS Market Prognosis, September 2014

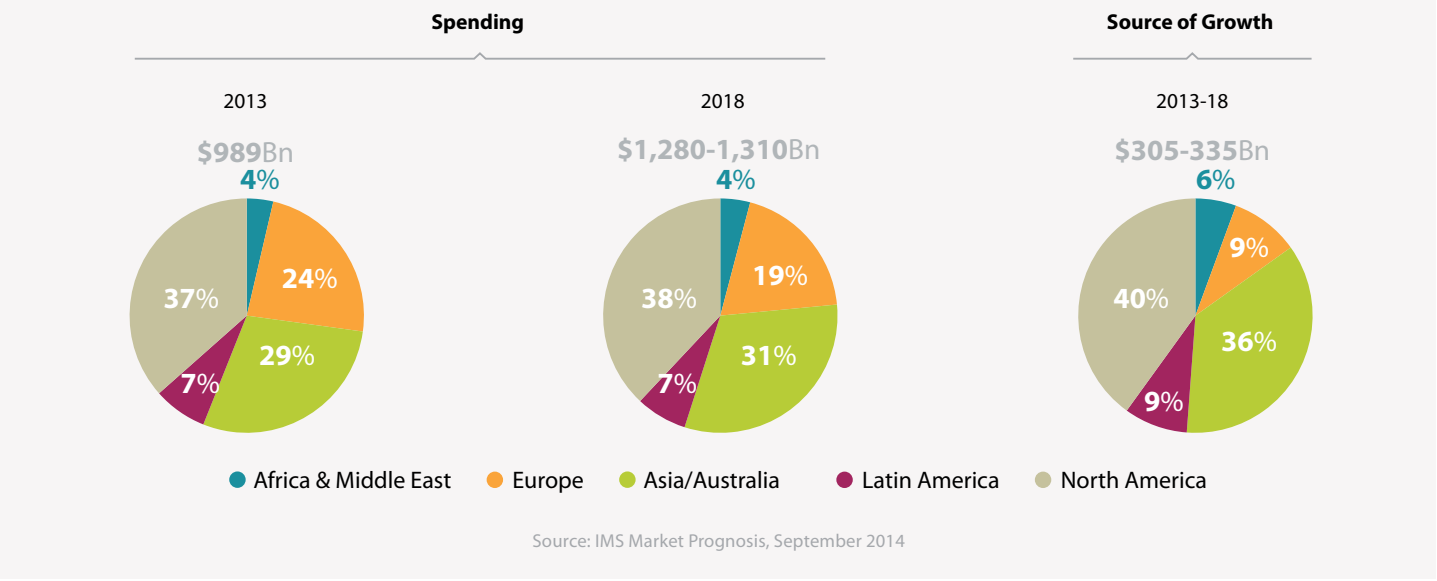
- Spending level increases are tied to recently expanded access, with 95% of the population now covered by public health insurance plans.
- Improvements to the healthcare infrastructure and community health services are expected under the current Five-Year Plan (2011-2015) and will further grow the market through 2018.
- Reform of the hospital sector will continue to impact prescribing, as cost-containment measures limit drug budgets to a fixed percentage of total budget and reduce profits obtained by hospitals for dispensing medicines.
- Policy changes in 2014 will bring more drugs under the remit of the National Development and Reform Commission, including those to treat serious diseases, exposing them to price ceilings and in-market price cuts that will continue to exert downward pressure on prices.
- While public institutions remain the main providers of hospital care, the growing number of private hospitals is expected to drive demand, providing shorter waiting times and better conditions: the number of private hospitals increased 15.9% in 2012 and policy aims are to double private capacity to 20% of national volume by 2015.

Chart notes:

Chart shading indicates forecast, and forecasted growth shows point forecast and high-low ranges. Spending includes retail pharmacy and institutional drug spending tracked by IMS audits. Total market sales forecasts take into account the audited sales as well as any distribution channel not audited by IMS Health. The unaudited share of the market is assumed to remain constant for the duration of the forecasting period. Spending in US$ with variable exchange rates. Growth in US$ with constant exchange rates. 2012 year growth rates reflects a trend break due to audit improvements.

North America continues to contribute the largest proportion to growth, but Asia is gaining

Geographic distribution of medicine spending



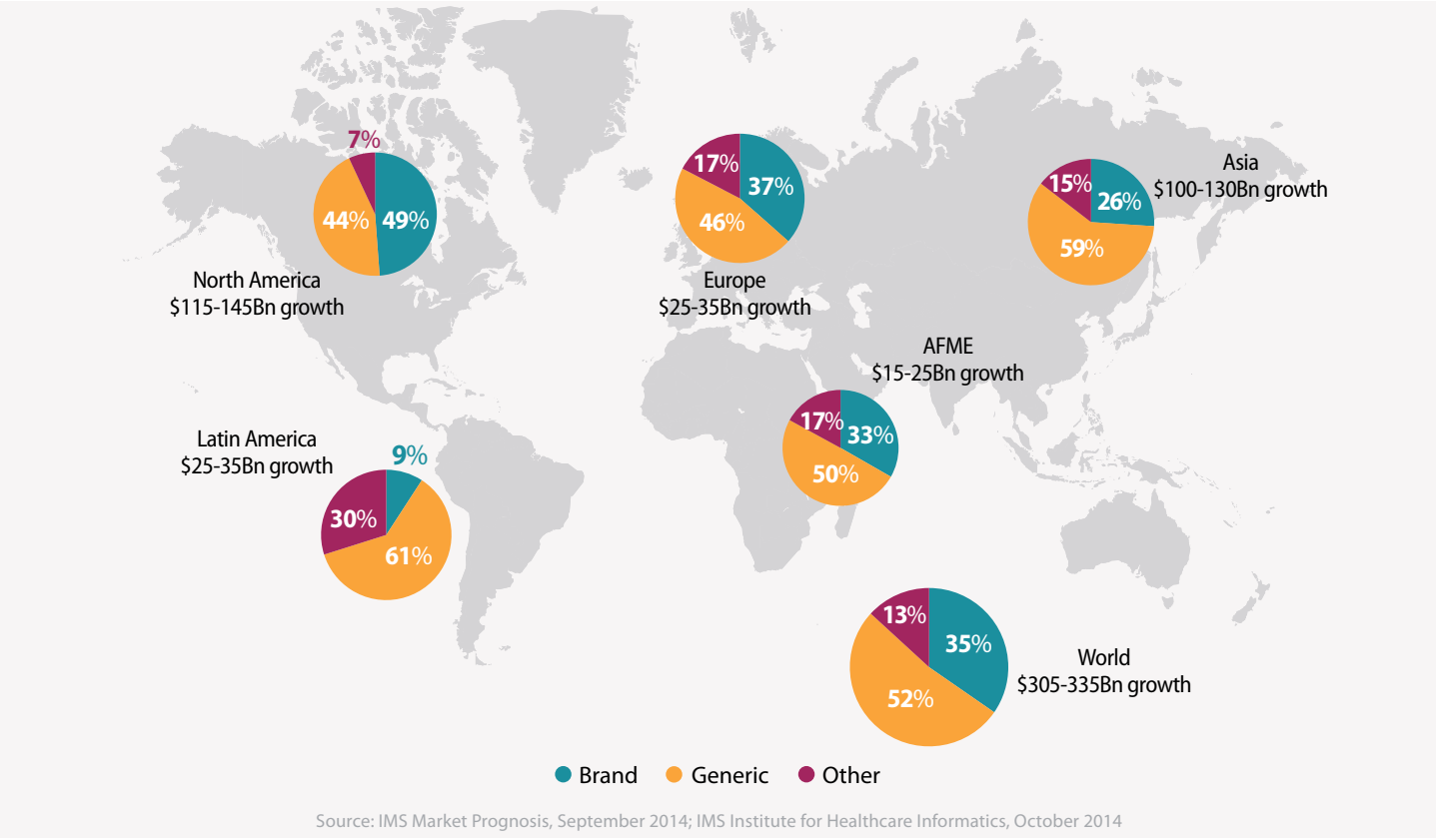
Source: IMS Market Prognosis, September 2014

- Strong economic recovery in the U.S. and recent healthcare reform have already had a positive impact on the use of medicines and will grow the market through the first half of the forecast period.
- Drug spending in Europe will remain limited by a weak economic recovery, low population growth and continued efforts to reduce public debt, including healthcare and drug spend.
- Asian export economies, including South Korea and India, will grow along with global recovery, increasing demand for medicines in Asia.
- Southeast and East Asia will grow at twice the global average, driven by population growth, rising incomes and improved access to healthcare.
- Political tensions in Russia, Ukraine, Thailand and Hong Kong pose a threat to economic stability and negative price pressure from government cost-control initiatives may also limit growth.
- Unrest in the Middle East and North Africa will further weaken Africa and the Middle East (AFME) economies and investment, although medicine spending growth is expected to continue with rising incomes in Africa and continued immigration to the Gulf region.

Chart notes:
Spending in US$ with variable exchange rates. Growth in US$ with constant exchange rates. Asia/Australia: includes China, India, Russia, Commonwealth of Independent States (CIS), SE Asia, Oceania and Japan. Contribution to growth may not add to 100% due to rounding.

Generics continue to drive growth globally

Geographic distribution of medicine spending



Source: IMS Market Prognosis, September 2014; IMS Institute for Healthcare Informatics, October 2014

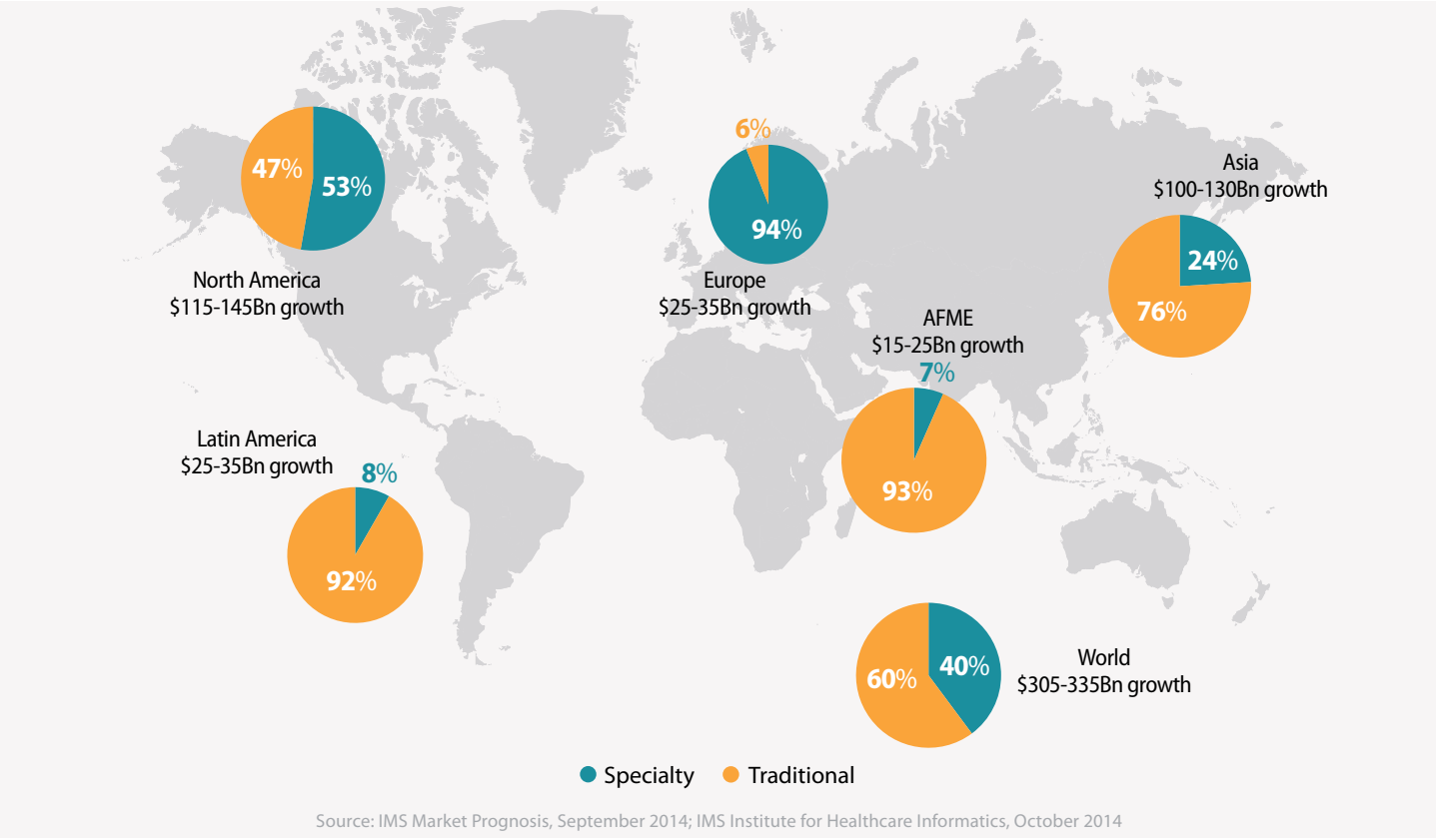
- Latin America has the highest proportion of growth from generics of any region; generics are the largest driver everywhere but North America.
- Increases in low-cost generics will continue to be seen in Asia, including India and Pakistan, as efforts to broaden access to basic health insurance is pursued.
- Locally manufactured generics will be the main beneficiaries of rising demand in Latin America, with local manufacturers increasing their share of the market.
- Innovative launches and price increases in North America keep generic growth more tempered than in other regions by offsetting genericization.
- Locally manufactured generics are a key source of affordable drugs in African markets, where domestic manufacturers often enjoy preferential treatment to encourage domestic production.
- Demand for generics has outpaced overall market growth rates in both Australia and New Zealand, while the sector has also benefited from a succession of major patent expiries.

Chart notes:

Growth in US$ using constant exchange rates. Other: OTC products and Rx products that never had patent protection and launched prior to expiration of the originator product. Asia: China, India, Russia, CIS state, SE Asia, Oceania and Japan. AFME: Africa and Middle East.

Specialty medicines are a strong driver in developed regions

Share of absolute growth 2013-2018 by region, specialty and traditional



Source: IMS Market Prognosis, September 2014; IMS Institute for Healthcare Informatics, October 2014

- In Europe, specialty medicines have emerged as the major growth driver as most new medicines now target niche populations with high unmet needs.
- Continued growth of traditional medicines in North America is offsetting specialty growth.
- In Latin America, public sector drug spending is predominant with cost-containment policies shifting growth to traditional medicines and limiting brand price growth.
- Specialty growth in Asia will grow from 21% in the previous five years to 24% in the next five, reflecting increased availability in those markets.
- Widespread poverty and a heavy disease burden add to the problems faced by patients in many African countries, focusing much growth on traditional therapies; growth in the AFME region including Egypt and Algeria will be driven by increases in the incidence of chronic, age-related conditions driving demand for traditional chronic therapies.

Chart notes:

Growth in US$ using constant exchange rates. Developed countries are U.S., Japan, Germany, France, Italy, Spain, Canada, U.K. and South Korea. Specialty/Traditional are defined using IMS MIDAS market segmentation methodology and IMS Institute analysis. Asia: China, India, Russia, CIS states, SE Asia, Oceania and Japan. AFME: Africa and Middle East.

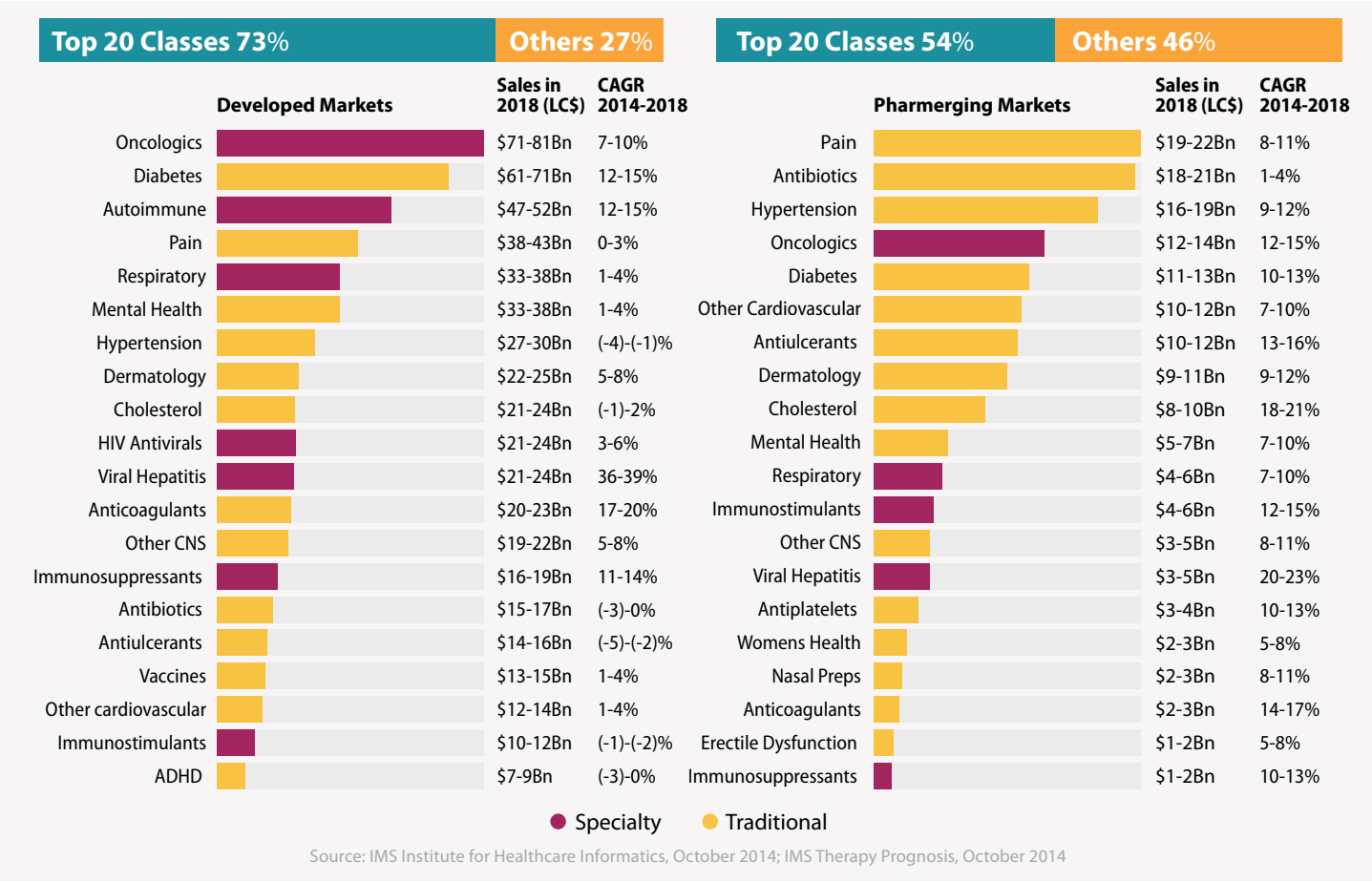
Transformations in disease treatment

Innovative medicines, increased access and advances in treatment will impact both developed and pharmerging countries for the next five years.

- Spending levels will differ significantly between developed and pharmerging regions, with greater spending on specialty medicines in developed countries.
- A high number of new molecular entities (NMEs) are expected to be launched annually, continuing a second wave of innovation similar to the levels launched in the mid-2000s.
- The greatest availability of new medicines continues to be high-income countries, but availability is increasing for pharmerging countries.
- Driving the pipeline are oncology drugs, anti-infectives and antivirals, and drugs targeting central nervous system disorders, all comprising 46% of the late-stage pipeline.
- Oncology spending will reach $100Bn globally by 2018, an absolute growth of $30-40Bn, driven by greater numbers of drug approvals and an increase in cancer incidence.
- Oncology innovation is energized by a number of immunotherapies, many of which have FDA Breakthrough Therapy Designation, with the potential for multiple follow-on indications, deepening an already full pipeline.
- Diabetes spending growth will be above 10% in both developed and pharmerging regions in the next five years, driven primarily by innovative new therapies and greater diagnosis rates.
- Diabetes will see a major influx of new technologies and innovations seeking to improve prevention, screening, diagnosis and treatment adherence for both type 1 and type 2 diabetics.
- Hepatitis C medicines will see greater use of treatments that cure the disease in the next five years, seeking to make dosing easier, shorten courses of treatment and reduce side effects.
- Treatment for hepatitis C will cure 9-14% of the HCV-infected population in the U.S. by 2018, with many programs to increase affordability and control cost emerging in both developed and pharmerging regions.

Specialty therapies continue to be more significant in developed markets than in pharmerging

Spending in 2018



Source: IMS Institute for Healthcare Informatics, October 2014; IMS Therapy Prognosis, October 2014

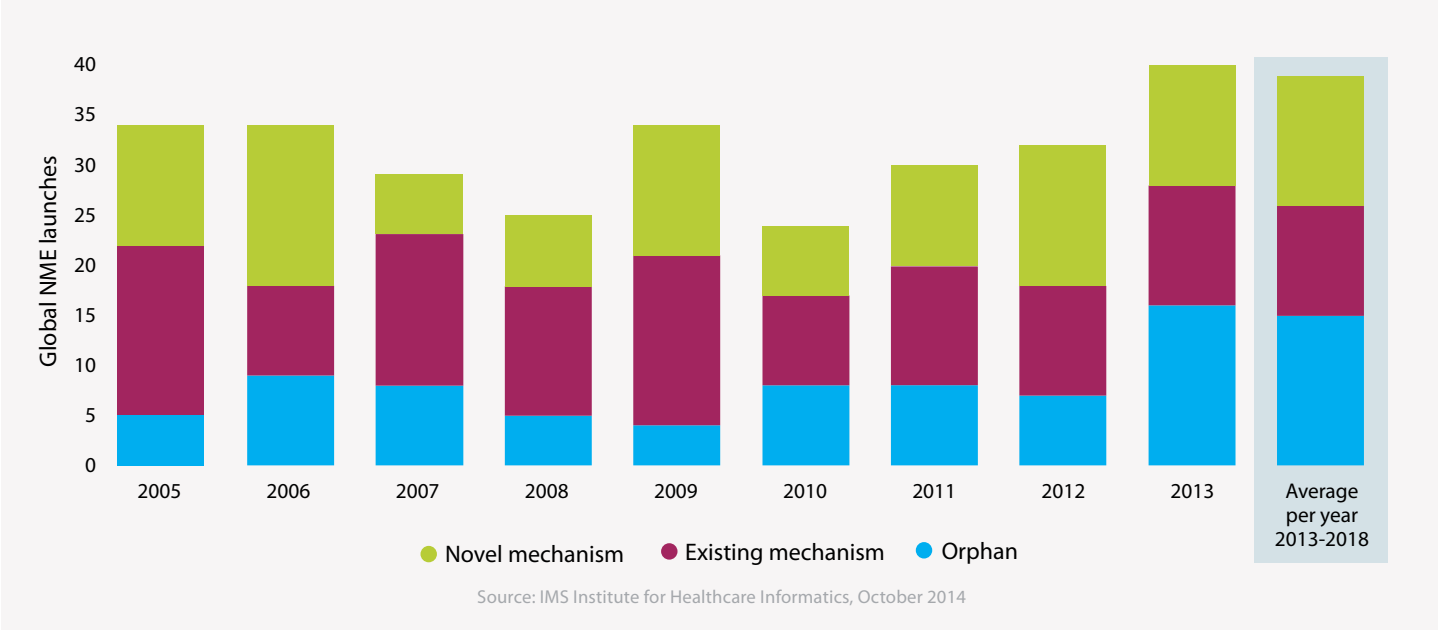
- The emergence of new therapies for hepatitis C have brought that therapy area into the top 20 for both developed and pharmerging countries.
- Oncology continues to be the largest category in developed countries, and the largest specialty area in pharmerging countries.
- Leading classes in pharmerging markets are dominated by pain, antibiotics and hypertension, while in developed markets specialty categories such as oncology and autoimmune diseases are more prominent.
- Six of the top 20 classes in developed markets will face patent expiration in the next five years and therefore declining growth.

Chart notes:

Spending in US$ with variable exchange rates. Growth in US$ with constant exchange rates. Specialty therapies are defined by IMS as products that are often injectable, high-cost, biologic or requiring cold-chain distribution. They are mostly used by specialists, and include treatment for cancer and other serious conditions, and often involve complex patient follow-up and monitoring. Therapy forecasts from IMS Health Therapy Prognosis Global October 2014 adapted by IMS Health Institute for Healthcare Informatics to represent global sales and to include additional therapy classes. Abbreviations: ADHD: Attention-Deficit Hyperactivity Disorder; CNS: Central Nervous System; HIV: Human Immunodeficiency Virus.

Consistent high numbers of innovative and orphan medicines expected through 2018

Global launch of new molecular entities (NMEs)



Source: IMS Institute for Healthcare Informatics, October 2014

- Through October 2014, there have been 31 NMEs approved globally and 26 launched, six of which are classified as orphans in either the U.S. or E.U., and 18 are specialty products.
- In 2014 there have already been 12 drugs approved in the U.S. that have FDA Breakthrough Therapy Designation, including the first biologic (meningococcal group B vaccine).
- Increasing numbers of orphan and breakthrough designation applications and steady approval rates are expected through the forecast period.

Chart notes:

New molecular entities include novel small molecule, biologic or novel combination products (where at least one of the ingredients is novel), launched for the first time globally. Novel mechanism therapies are those with novel mechanism of action applied for the first time in the approved indication. Existing mechanism therapies have mechanisms of action already used in their approved indication, though may still represent important clinical advances. Orphan therapies are approved for orphan-designated indications. molecular or biologic entity or combination where at least one element is novel.

The availability of new medicines varies by country and disease

Global new molecular entities 2008-12 - availability as of 2013

Country	Global	US	Japan	Germany	France	Spain	Italy	UK	Canada	South Korea	Brazil	Russia	India	Mexico	China
Total	**154**	**104**	**53**	**82**	**58**	**53**	**56**	**78**	**60**	**45**	**45**	**34**	**21**	**45**	**32**
% of Total		**68%**	**34%**	**53%**	**38%**	**34%**	**36%**	**51%**	**39%**	**29%**	**29%**	**22%**	**14%**	**29%**	**21%**
Anti-infectives & Antivirals	8	5	5	4	2	4	3	4	4	1	3	2	2	2	3
Arthritis/Pain	8	5	5	4	2	4	3	4	4	1	1	2	2	2	3
Blood	9	6	2	4	4	4	4	4	4	4	6	2	3	7	2
Cardiovascular	10	6	2	5	1	4	3	4	4	4	2	1	3	3	1
CNS	12	8	3	7	6	4	5	6	3	0	4	1	3	3	1
Dermatology	3	2	2	2	1	2	1	2	2	1	1	1	0	2	0
Diabetes	11	5	8	4	2	5	3	6	3	5	3	3	4	4	3
Gastrointestinal	6	4	1	3	2	2	1	3	3	2	1	1	0	2	1
GU & Hormones	10	6	2	5	3	4	5	4	3	5	1	2	1	2	2
Immune System	9	8	3	9	6	6	7	8	5	2	6	4	0	4	3
Metabolic	6	4	2	1	1	1	1	1	0	0	0	0	0	0	0
Oncologics	41	31	10	26	20	10	14	24	18	13	10	9	3	11	7
Ophthalmics	5	4	2	2	1	0	1	2	2	3	4	0	1	0	2
Other	3	1	1	0	0	0	0	0	0	0	0	1	0	0	0
Respiratory	7	5	3	5	3	4	4	5	4	2	3	2	1	4	2

Source: IMS Institute for Healthcare Informatics, October 2014

- The countries with the highest availability of all NMEs launched 2008-12 continue to be high income countries, including the U.S., Germany, the U.K., Canada and Italy.
- Pharmerging markets have a lower percentage of possible NMEs across all medicine classes.
- Approximately 32% of NMEs launched in at least one country are not available in the U.S.
- Compared to a similar analysis of the availability in 2012 of the 2007-11 cohort of NMEs, pharmerging countries all achieved increases in availability.[1]
- In developed markets, the U.K. had the biggest increase (9%) and Spain the biggest decrease (-14%) in availability over the 2012 analysis.

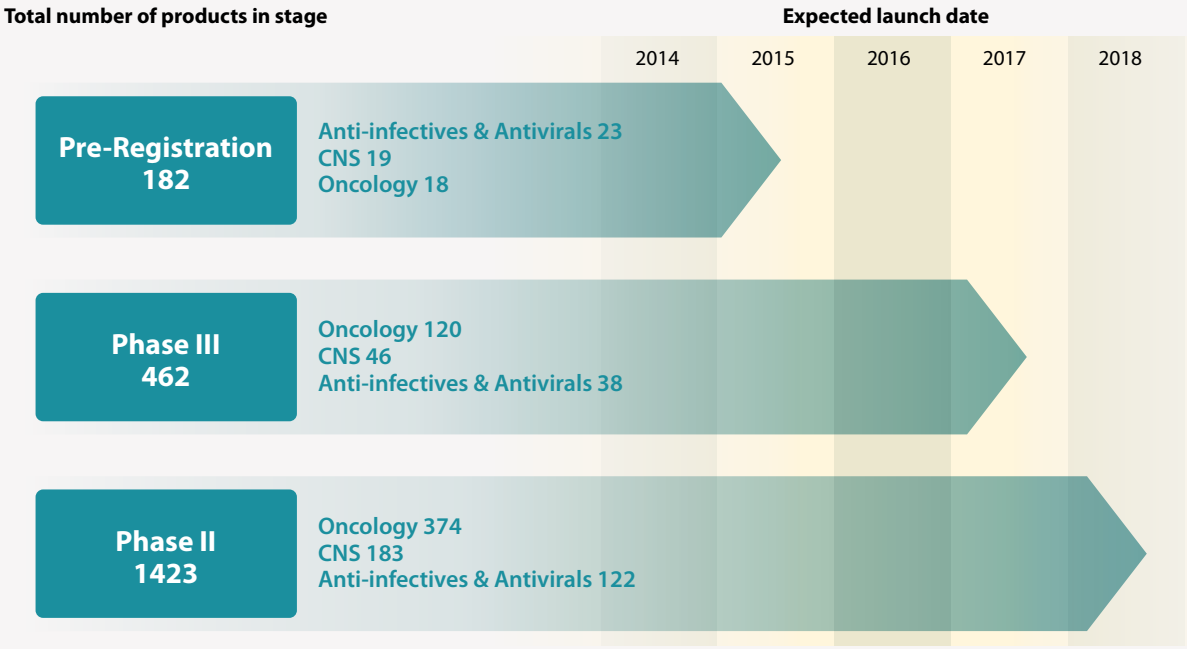
Chart notes:

[1]The Global Use of Medicines: Outlook through 2016, IMS Institute for Healthcare Informatics, July 2012

New molecular entities include small molecule, biologic or novel combination products (where at least one of the ingredients is novel), with global launch in at least one country between 2008-12 and measured by availability in specific countries by end of 2013. CNS: Central Nervous System; GU: Genito-urinary.

Oncology products continue to drive the pipeline

Number of products in pipeline by phase and therapy area



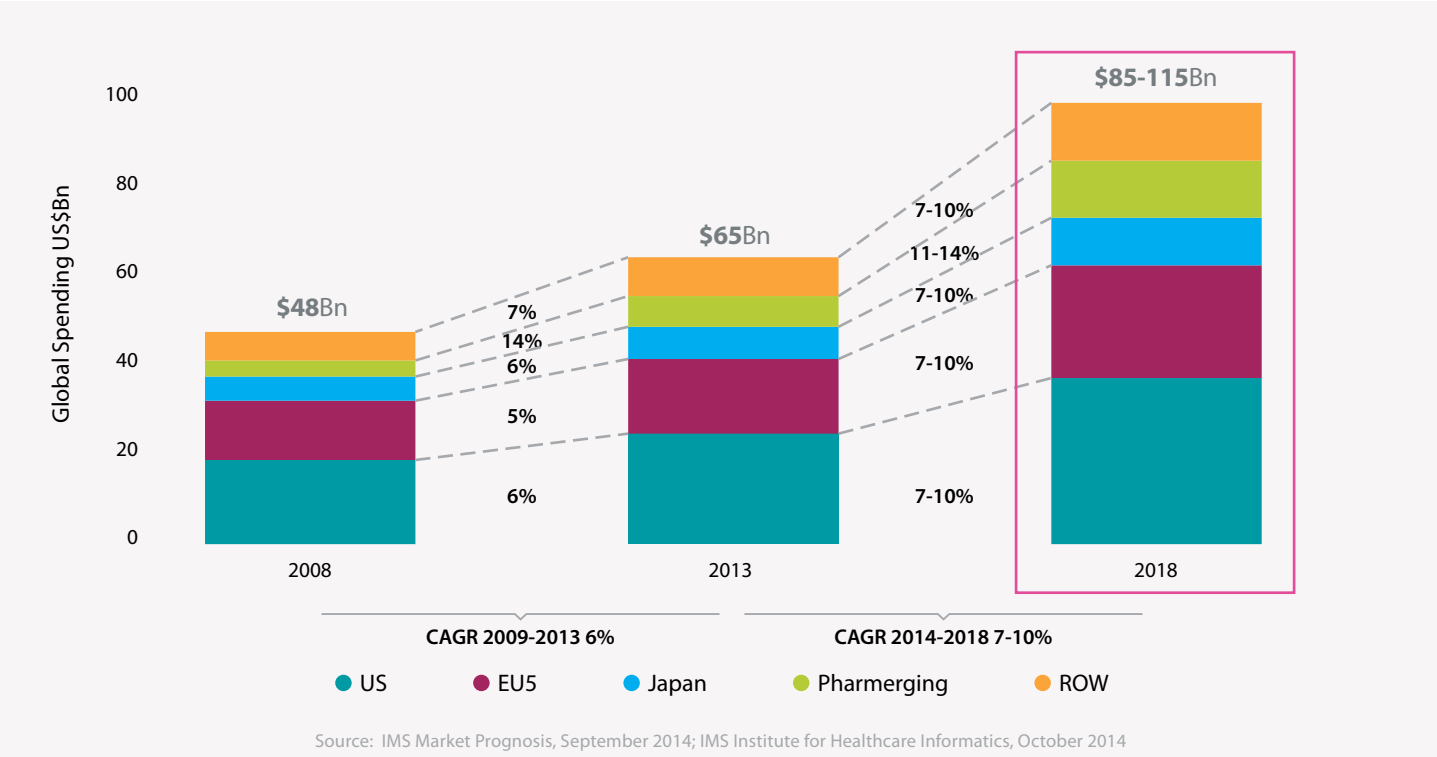
Source: IMS R&D Focus; IMS Institute for Healthcare Informatics, October 2014

- Globally, oncology makes up 31% of the total pipeline, 25% of the late-stage pipeline (Phase II through pre-registration), and is double the size of the next highest class.
- The top three classes in the late-stage pipeline constitute 46% of the total late phase pipeline.
- Biologics make up 36% of the late-stage pipeline and 45% of the late stage oncology pipeline.
- Approvals of oncology late-stage medicines will be accelerated with many having gained FDA's Breakthrough Therapy Designation; 46% of the total number of breakthrough designations in oncology.
- The second largest area of development is the treatment of CNS disorders with a focus on mental health, multiple sclerosis and neuropathy indications.
- Anti-infectives development is focused in large part around HIV and hepatitis C products.

Chart notes:
Count of products in pipeline include new molecular entities, fixed-dose combinations and line extensions.
Number of products in the pipeline not risk-adjusted.

Oncology spending growth in the total market reaches $100 billion by 2018

Global spending and growth, 2008-2018



Source: IMS Market Prognosis, September 2014; IMS Institute for Healthcare Informatics, October 2014

- Spending on oncology medicines globally is expected to grow by over 50% to exceed $100Bn in 2018 driven by increases in cancer incidence of up to 31% by 2020, and rising rates of melanoma and kidney cancers.[1]
- Absolute growth is expected to be $25-45Bn, compared to $17Bn in the prior five years.
- High numbers of global drug approvals and launches in 2012 and 2013 and a strong pipeline will drive higher growth in developed markets in the forecast period.
- Greater use of multi-targeted, or "stacked," treatments that demonstrate greater survival benefit will also increase spending levels in developed markets.
- Biosimilars will play a greater role in cancer treatment in pharmerging markets but are expected to have limited impact in developed countries over the next five years.

Chart notes:

Spending in US$ with variable exchange rates. Compound annual growth rate (CAGR):Charted growth from 2008-13 and 2014-18 include impacts of exchange rate variability.

[1]Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the Cost of Cancer Care in the U.S.: 2010 2020. *J Natl Cancer Inst. 2011 Jan.*

Oncology innovation driving pipeline growth includes new immunotherapies

Select oncology drugs in the pipeline

Mechanism of Action	Molecules	Indications
PD-1 Inhibitors	nivolumab; pidilizumab; MK-3475; MEDI4736	Melanoma; NSCLC; mCRC; LBCL; bladder
CDK inhibitors	palbociclib; ribociclib; roniciclib; dinaciclib	Breast; NSCLC; melanoma; SCLC; CLL
Anti-CTLA-4 antibody	tremelimumab	Mesothelioma; CRC; NSCLC; melanoma
CAR T-cell therapy	CTL019; UCART 19	Cervical; CLL
ALK inhibitors	alectininib; ganetespid	NSCLC; lymphomas

Source: IMS R&D Focus; IMS Institute for Healthcare Informatics, October 2014

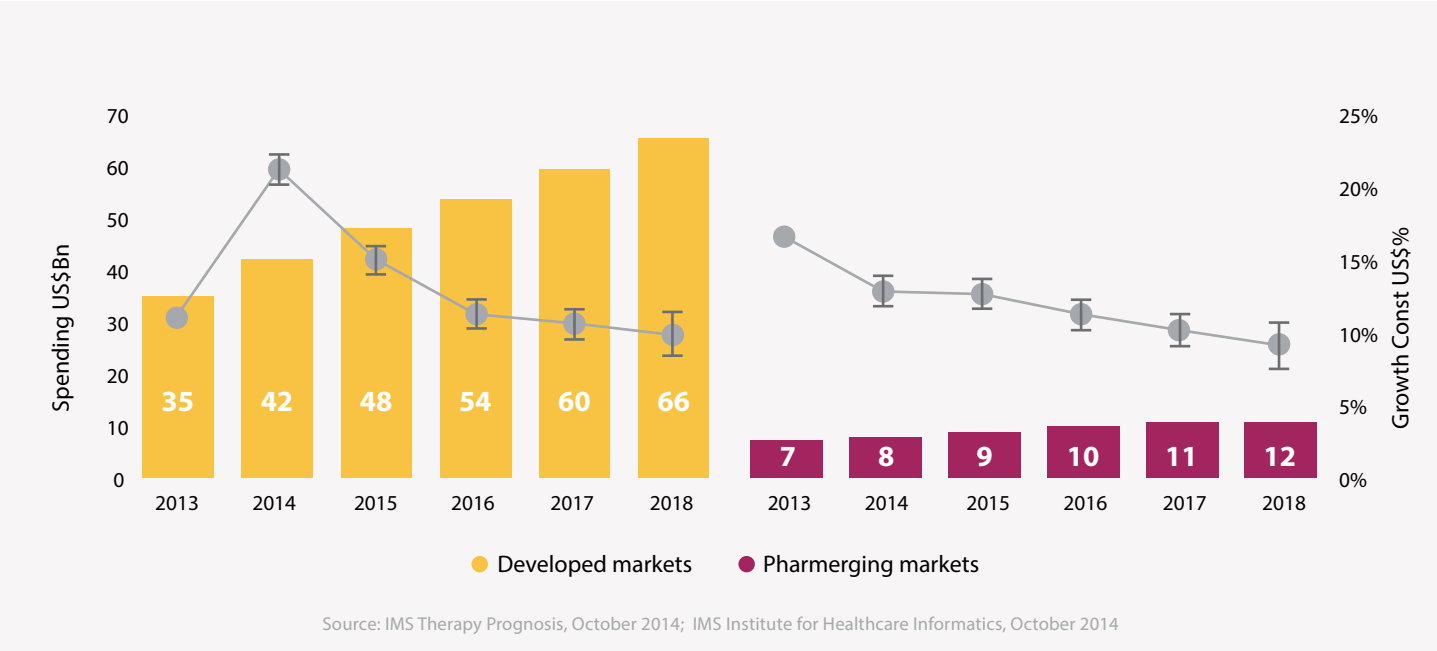
- Immunotherapies are expected to gain many follow-on indications using the immune system to target cancer broadly rather than targeting site-specific tumors.
- PD-1 targeting drugs that boost immune system response show robust clinical response in trials and strong potential to grow the market in the next five years.
- In the late-stage pipeline, CDK inhibitors, which inhibit cancer cell proliferation, hold the promise of improved outcomes across various cancer types due to most cancer cells demonstrating CDK mutations.
- CTLA-4 will continue to be a key molecular target for immune activation in the next five years, having proven success with ipilumumab.
- With FDA Breakthrough Status, CAR-T cell therapies are the next generation of personalized medicine, modifying the body's own T-cells to kill cancer cells.
- Next-generation ALK inhibitors address crizotinib resistance and will become the standard of care in the next five years.
- Combinations of PD-1s with other targeted therapies will increase in the next five years.

Chart notes:

Mechanisms of actions, molecules, and indications are selected examples of areas for the greatest potential growth through 2018. Abbreviations: PD-1: programmed cell death protein 1; CDK: Cyclin-dependent kinase; CTLA-4: Anti-cytotoxic T-lymphocyte antigen 4; CAR: Chimeric Antigen Receptors; ALK: Anaplastic Lymphoma Kinase protein; NSCLC: Non-small Cell Lung Cancer; mCRC: metastatic Colorectal Cancer; DLBCL: Diffuse Large B-cell Lymphoma; SCLC: Small-cell Lung Cancer; CLL: Chronic Lymphocytic Leukemia.

Diabetes spending growth is moderating

Diabetes spending between 2013 and 2018



Source: IMS Therapy Prognosis, October 2014; IMS Institute for Healthcare Informatics, October 2014

- In developed markets, spending on diabetes drugs will rise from $35 to $66 billion in 2018.
- Spending growth in 2014 is driven by rising prices for modern insulins in the U.S., though this does not reflect the effect of off-invoice discounts and rebates that may offset these price increases.
- In developed markets, newer therapies such as GLP-1 antagonists, DPP-IV inhibitors and SGLT2 inhibitors will continue to drive growth.
- The coming wave of biosimilar insulins will bring about significant commercial changes and cost savings for insulin-dependent patients.
- In pharmerging markets, spending on diabetes drugs will increase 10-13% over the next five years.
- Spending growth in pharmerging countries is largely attributed to rising incidence and diagnosis rates, which have led to greater insulin and metformin use; they have been slower to adopt newer therapies.
- Eighty percent of people with diabetes live in low- and middle- income countries.[1]

Chart notes:

Developed: U.S., Japan, Germany, France, Italy, Spain, U.K., Canada, South Korea. Pharmerging: China, Brazil, Russia, India, Algeria, Argentina, Colombia, Egypt, Indonesia, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam. Class forecasts adapted from IMS Market Prognosis September 2014. Spending in US$ with variable exchange rates. Growth in US$ at constant exchange rates.

[1]IDF Diabetes Atlas, Sixth Edition. International Diabetes Federation. 2013. Available from: www.idf.org/diabetesatlas

Innovative treatments, technologies and policies help combat the global diabetes epidemic

Recent innovations in diabetes prevention and treatment

	Treatments	Technologies	Policies
Obesity	Newer diabetes therapies help with weight loss New weight loss drugs in 2014	Mobile apps Wearables Bariatric surgery Gastric balloons	Public and employer sponsored weight loss incentive programs (UK, UAE)
Diagnosis	Blood biomarker (a-HB) detects insulin resistance before prediabetes develops	Pupillometer to diagnose diabetic neuropathy ZnT8Ab assay HbA1cDx lab test	Policies encourage targeted screening for at-risk populations
Disease Management	New insulin delivery mechanisms Closed-loop artificial pancreas Immunoisolation to protect beta-cell transplants Regenerative medicine Nanotechnology	Glycemic management software for EMRs Smart contact lens to detect blood glucose levels Game consoles and apps connect with glucose monitors to reward adherence	WHO global action plan set goal of 25% reduction in diabetes mortality by 2025[1] Accountable Care Organization (ACO) performance rated on readmissions Payers and pharma partner to increase adherence

Source: IMS Institute for Healthcare Informatics, October 2014

- Rising obesity rates are fueling the global diabetes epidemic; new weight loss medicines and diabetes therapies with weight loss benefits are increasingly used to prevent or delay onset of Type 2 diabetes and its complications.
- Thirty percent of diabetics in high-income countries and as many as 90% of diabetics in sub-Saharan Africa are undiagnosed; globally, an estimated 175 million people do not know they have the disease.[2]
- Complications stemming from undiagnosed and uncontrolled diabetes result in higher lifetime costs to patients and payers.
- New approaches to disease management are needed to address swelling patient populations and mounting costs.
- Apps and devices designed to identify at-risk patients, encourage healthy behaviors, improve adherence and provide better glycemic control will improve the lives of diabetes patients in 2018.

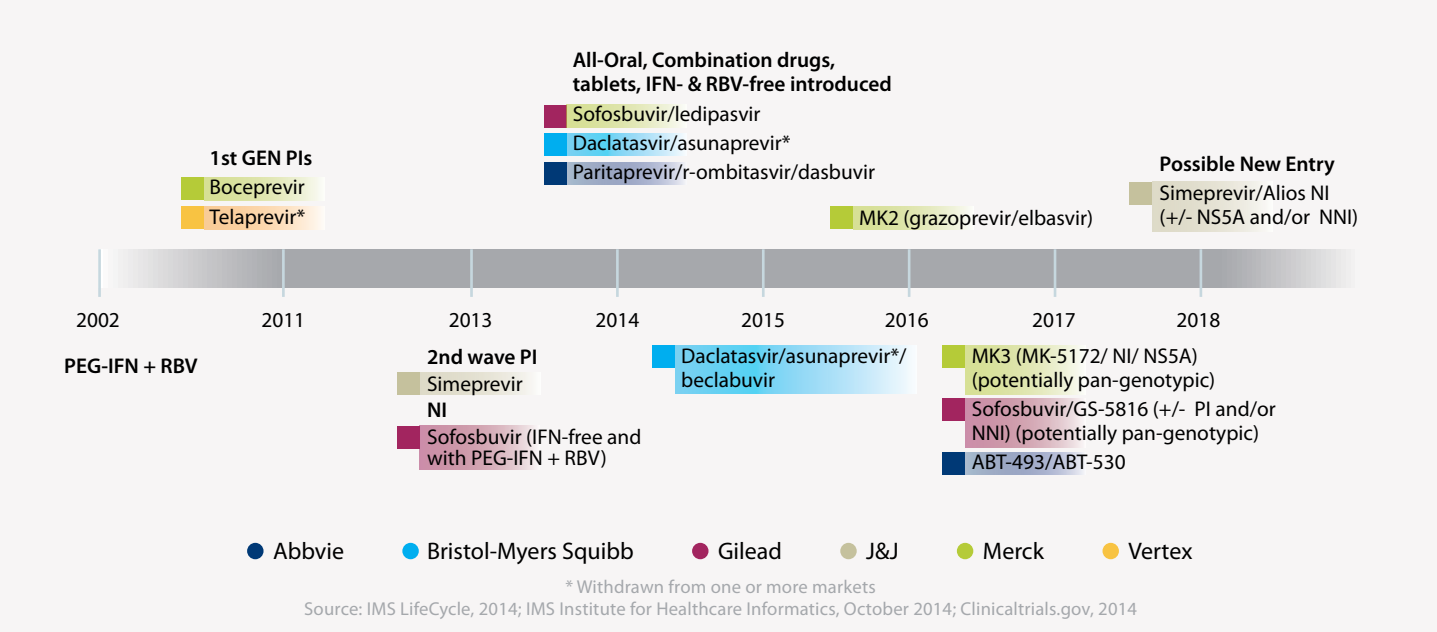
Chart notes:

[1]Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. World Health Organization. 2013. Available from: www.who.int/nmh/publications/ncd-action-plan

[2]IDF Diabetes Atlas, Sixth Edition. International Diabetes Federation. 2013. Available from: www.idf.org/diabetesatlas

Less effective drugs retire as potent combination drugs increasingly enter the market through 2018 providing more treatment options

Hepatitis C virus drug regimen roadmap



* Withdrawn from one or more markets

Source: IMS LifeCycle, 2014; IMS Institute for Healthcare Informatics, October 2014; Clinicaltrials.gov, 2014

- Hepatitis C virus (HCV) medicines have undergone accelerated innovation in the past four years as improvement in drug technology has yielded sustained virologic responses (SVRs) of nearly 100% in genotype 1 patients from SVRs of 30- 50% only three years ago.
- The next four years will see combinations of direct-acting antiviral agents (DAA) that are administered without interferon and ribavirin, and with increased efficacy in pan-genotypic HCV infections, easier dosing, shorter courses of treatment and reduced side effects.
- DAAs combined with interferon & ribavirin may remain viable options in pharmerging markets.
- New HCV medicines will provide patients, providers, payers and governments with more treatment options.
- Starting with the entry of AbbVie's triple combination, manufacturers will innovate around affordability and cost control as they seek to compete with other equally effective therapies.
- Competition on list price will likely begin with the entry of BMS's triple combination regimen.

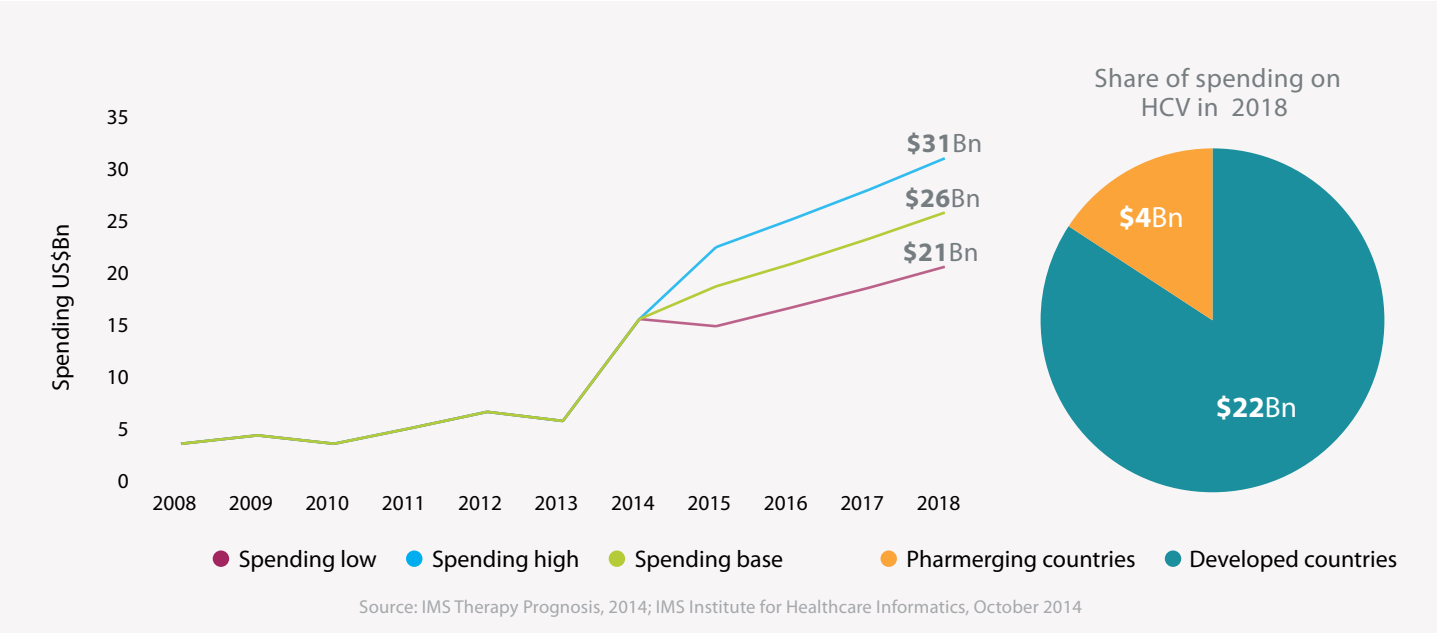
Chart notes:

Market entry of regimens were estimated by taking into consideration: candidates in pipeline, clinical trial stage, clinical trial end dates and conferment of breakthrough designation by US FDA. Future regimens are predicted based on market patterns and events, and pipeline activity.

Abbreviations: PEG-IFN: Pegylated Interferon, RBV: Ribavirin, PI: NS3/4A Protease Inhibitors, GEN: Generation, NI: NS5B Nucleos(t)ide Inhibitor, NNI: NS5B Nonnucleos(t)ide Inhibitor, NS5A: NS5A Replication Complex Inhibitor

Global spending on HCV drugs is expected to exceed $100Bn during the period 2014-18

Global spending on viral hepatitis through 2018[1]



Source: IMS Therapy Prognosis, 2014; IMS Institute for Healthcare Informatics, October 2014

- By 2018, the U.S. is expected to have treated approximately 500,000 HCV-infected patients with at least 450,000 patients cured, representing 9-14% of the U.S. HCV-infected patient population.[2]
- The next five years will likely see pharmaceutical manufacturers introduce innovative strategies around affordability and cost control as they seek to compete with other equally effective therapies.
- Manufacturers will compete for share in pharmerging markets as spending on viral hepatitis doubles by 2018.
- Government and public spending on HCV infection will be geared towards eradication, and while eradication will not be achieved in the next four years, governments may seek incentives for treatment of the disease in high-risk populations.
- The solutions to affordability and the public health concerns formed in the HCV market will be applied to adjacent therapeutic areas in the coming years.

Chart notes:

The base spending scenario assumes that HCV combination drugs in the pipeline are launched as scheduled and uptake is as anticipated. The high scenario assumes that price and uptake increase significantly above expectation a low scenario assumes that price and uptake decrease significantly below expectation.

[1] Includes the nine developed countries and the 21 pharmerging countries (such as China, Russia, India and Brazil) that accounted for more than 95% of global viral hepatitis spending in the MAT September 2014.

[2] Assuming 100,000 patients are treated every year and SVR of 90% is attained.

Notes on sources & definitions

This report is based on the IMS products and services detailed in the table below and the research of the IMS Institute for Healthcare Informatics.

IMS Market Prognosis™ is a comprehensive, strategic market forecasting publication that provides insight to decision makers about the economic and political issues that 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™ 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 Prognosis™ Includes sales and volume forecasts for major therapy areas in 10 key markets, and includes interactive modeling and event-based forecasts and comprehensive market summary.

Definitions and conventions:

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 (Q2 2014) 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, U.K.), Canada and South Korea.

Pharmerging countries are defined as those with >$1Bn absolute spending growth over 2014-18 and which have GDP per capita of less than $25,000 at purchasing power parity (PPP). Tier 1: China; Tier 2: Brazil, India, Russia; Tier 3: Mexico, Turkey, Venezuela, Poland, Argentina, Saudi Arabia, Indonesia, Colombia, Thailand, Ukraine, South Africa, Egypt, Romania, Algeria, Vietnam, Pakistan and Nigeria.

Global country rankings

Rank	2008	Index
1	U.S.	100
2	Japan	27
3 ▲5	China	14
4	France	14
5 ▼2	Germany	14
6	Italy	9
7	Spain	7
8 ▼3	U.K.	7
9	Canada	7
10 ▲1	Brazil	5
11 ▼1	Mexico	4
12 ▲1	Australia	4
13 ▲1	S. Korea	4
14	Russia	3
15 ▼3	India	2
16 ▲1	Turkey	2
17 ▲5	Greece	2
18 ▼3	Netherlands	2
19 ▼1	Poland	2
20 ▼4	Belgium	2

Rank	2013	Index
1	U.S.	100
2 ▲1	China	29
3 ▼1	Japan	26
4 ▲1	Germany	14
5 ▼1	France	11
6 ▲4	Brazil	9
7 ▼1	Italy	8
8	U.K.	8
9 ▼2	Spain	6
10 ▼1	Canada	6
11 ▲3	Russia	5
12 ▼1	Mexico	4
13 ▲2	India	4
14 ▼2	Australia	4
15 ▼2	S. Korea	4
16 ▲9	Argentina	2
17 ▲2	Poland	2
18 ▼2	Turkey	2
19 ▲1	Belgium	2
20 ▼2	Netherlands	2

Rank	2018	Index
1	U.S.	100
2	China	36
3	Japan	22
4	Germany	12
5 ▲1	Brazil	11
6 ▼1	France	8
7 ▲1	U.K.	7
8 ▼1	Italy	7
9 ▲1	Canada	5
10 ▲1	Russia	5
11 ▲2	India	5
12 ▼3	Spain	5
13 ▼1	Mexico	4
14 ▲1	S. Korea	3
15 ▼1	Australia	3
16 ▲2	Turkey	2
17 ▲5	Saudi Arabia	2
18 ▼1	Poland	2
19 ▼3	Argentina	2
20 ▲8	Indonesia	2

▼▲ Change in ranking over prior five years

Source: IMS Market Prognosis, September 2014

Appendix notes:

Ranking in all years based on spending in constant US$ at Q2 2013 exchange rates.

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

Region & leading country spending

US$ billions	2013	2009-2013 CAGR	2018	2014-2018 CAGR
Global	989.3	5.2%	1,280-1,310	4-7%
Developed	623.6	3.1%	766-796	3-6%
U.S.	340.0	3.6%	450-480	5-8%
EU5	156.3	2.2%	157-185	1-4%
Germany	45.9	3.9%	48-58	2-5%
France	37.1	-0.7%	30-40	(-2)-1%
Italy	27.9	2.5%	28-36	2-5%
U.K.	24.6	5.5%	27-37	4-7%
Spain	20.7	0.3%	20-26	(-1)-2%
Japan	94.1	3.2%	94-120	1-4%
Canada	21.4	1.4%	23-33	3-6%
South Korea	11.7	4.2%	12-19	2-5%
Pharmerging	242.9	13.6%	358-388	8-11%
China	97.7	19.0%	155-185	10-13%
Tier 2	62.4	14.4%	88-98	9-12%
Brazil	30.6	15.2%	36-46	9-12%
Russia	17.7	12.8%	20-30	7-10%
India	14.1	14.9%	21-31	9-12%
Tier 3	82.8	8.1%	95-125	5-8%
Rest of World	122.9	3.3%	124-154	2-5%

Source: IMS Market Prognosis, September 2014

Appendix notes:

Spending in US$ with variable exchange rates.

Compound annual growth rate (CAGR) expressed in US$ at constant exchange rates.

Tier 3 Pharmerging: Algeria, Argentina, Colombia, Egypt, Indonesia, Mexico, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam.

Authors

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Murray Aitken is Executive Director, IMS Institute for Healthcare Informatics, which provides policy setters and decision makers in the global health sector with objective insights into healthcare dynamics. He assumed this role in January 2011. Murray previously was Senior Vice President, Healthcare Insight, leading IMS Health's thought leadership initiatives worldwide. Before that, he served as Senior Vice President, Corporate Strategy, from 2004 to 2007. Murray joined IMS Health in 2001 with responsibility for developing the company's consulting and services businesses. Prior to IMS Health, Murray had a 14-year career with McKinsey & Company, where he was a leader in the Pharmaceutical and Medical Products practice from 1997 to 2001. Murray writes and speaks regularly on the challenges facing the healthcare industry. He is editor of Health IQ, a publication focused on the value of information in advancing evidence-based healthcare, and also serves on the editorial advisory board of Pharmaceutical Executive. Murray holds a Master of Commerce degree from the University of Auckland in New Zealand, and received an M.B.A. degree with distinction from Harvard University.

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Michael serves as Research Director for the IMS Institute, setting the research agenda for the Institute, leading the development of reports and projects focused on the current and future role of biopharmaceuticals in healthcare in the U.S. and globally. Michael writes and speaks regularly on these and other topics and he is sought after for his unique and pragmatic perspectives, backed by rigorous analysis and research, on issues of interest to pharmaceutical companies, financial analysts, trade groups, policy advocates and regulatory agencies. Michael joined IMS Health in 1999 and has held roles in customer service, marketing and product management, and in 2006 joined the Market Insights team, which in 2011 became the IMS Institute for Healthcare Informatics. Michael holds a B.A. in History and Political Science from the University of Essex, Colchester, U.K. and an M.A. in Journalism and Radio Production from Goldsmiths College, University of London, U.K.

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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 Health'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 Health 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:

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

Optimizing the **performance of medical care** through 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 require 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.

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