PharmaValues: Global analysis

THEME

Demographic exposure to ageing

The ageing of the population is well known and has been the subject of many reports. In this note we review recent drug consumption data by age for well-audited markets such as Germany and the UK. Exposure to drugs over used by the elderly should result in disproportionate volume uplift in the future. This may go some way to offset the increased price pressure which governments are likely to have to apply in the future.

Using our proprietary PharmaValues database, we forecast exposure to age-related demographic changes for marketed and pipeline drugs at each of the companies under our global coverage.

- Companies with the highest current exposure to the elderly include: Dendreon, Celgene, Roche, Novo Nordisk and Ono (portfolios geared towards cancer, diabetes and glaucoma).

- Companies with the highest incremental exposure (from the pipeline) to the elderly include: Elan (bapineuzumab - Alzheimer's), Amgen (Prolia - osteoporosis), Taisho (Boniva - osteoporosis, TS-071 - diabetes) and Bayer (Xarelto – anti-thrombosis).

Figure 1: Global sector sales forecasts, stratified by over/under use by elderly

Source: Company data, Credit Suisse estimates (2011E-2018E)

Credit Suisse PharmaValues is a proprietary valuation tool for the global pharmaceutical and biotechnology industry. It uses a proprietary NPV algorithm to generate a product-by-product valuation based on nine key inputs per drug. PharmaValues is available online at www.credit-suisse.com/pharmavalues. Please contact your Credit Suisse sales rep. for access.
Healthcare exposure to ageing

Key demographic trends

The ageing of the population in all key markets is well known and has been the subject of numerous research articles. Although the current generation of the old in many countries is far richer than any cohort in the past, the high level of government funding for healthcare, which is disproportionately used by the elderly, is likely to put additional strain on already stretched budgets.

Figure 2: Dependency Ratio (elderly/working population)  

![Dependency Ratio Graph](image)

Source: UN Population database, Credit Suisse estimates

Figure 3: Aggregate age cohorts US, China, Japan, Germany, UK

![Age Cohorts Graph](image)

Source: UN Population database, Credit Suisse estimates

Figure 4: Overall drug usage by age in various countries

![Drug Usage by Age Graph](image)

Source: Germany: Arzneiverordnungs Report, UK Astro-PUS, Japan, Ministry of health and welfare, China Peking University, US ARHQ Company data, Credit Suisse estimates

Please see the recent Credit Suisse report, Macro “Fiscal Sustainability” to Micro “Economic Conditions of the Old” in the “Oldest Five” Countries, dated 10 August 2011
Volume growth could mitigate price pressure

In the US, a focus by investors on sales to Medicare reflects a concern about increased price pressures for US government funded programmes which focus on the elderly. The reality for the industry is that these pressures are essentially global. Japan is already experiencing a far worse demographic swing than any other major pharma market. (Figure 2).

![Figure 5: Increased consumption of older patients - AZN general IR presentation](source)


Figure 6 shows how volume demand in the major 5 markets (US, Japan, UK, China, Germany) has changed historically, based on demographic changes and how it may change going forwards. We have split out the various components to demand growth such as straight population growth, change in demographics (using German data in 2010 as a proxy for age cohort utilisation) and changes in utilisation (based on historic German data). For the forecast periods, we have used UN population and age cohort projections and assumed continued utilisation growth based on the average of German changes over the past 10 years. This data set suggests annual demand growth of at least 2% per annum and potentially +5% if annual demand growth seen in the past 5 years were to continue.

In countries with a high degree of government funding of pharmaceuticals, such as the major European markets and Japan, this level of volume demand growth is unsustainable without some offsets in the form of price cuts, higher co-pays or other controls on demand. In the short-term, some respite may come from the wave of patent expiries that is likely to reduce overall drug bills in 2012-2013.
Figure 6: Change in annual volume demand due to population, demographics and extrapolated utilisation trends

Source: UN population data, German utilisation data, Credit Suisse estimates
Elderly drug utilisation by therapeutic category

Germany

In Figure 7, we illustrate the volume utilisation for selected drug categories in Germany in 2009. We also compare the change in utilisation over time between 2001 and 2009. The data highlights the significant increase in drug use in elderly, especially in hypertension, lipid lowering and drugs for diabetes. Trends are very similar between 2011 and 2009. One notable exception is the reduced level of “sex hormones” in the >45-year-old cohorts. This reflects the much lower use of hormone replacement therapy (HRT) after the Million Women study (UK) and the Women’s Health Initiative (US) showed the negative health outcomes of some types of HRT.

Figure 7: German drug volume usage per capita by age, 2009

![Graph showing drug volume usage per capita by age, 2009](image)

Source: Arzneiverordnungs Report 2010

Figure 8: Volume usage per capita by age, 2001

![Graph showing volume usage per capita by age, 2001](image)

Source: Arzneiverordnungs Report 2002

Figure 9: Volume usage per capita by age, 2009

![Graph showing volume usage per capita by age, 2009](image)

Source: Arzneiverordnungs Report 2010
United Kingdom

In Figure 10 we look at utilisation data for the UK based on the cost weight of drug use by age. We have used the Age, Sex and Temporary Resident Originated Prescribing Units (ASTRO-PUs), which is a value-based rather than a volume-based dataset. The trends are very similar to those we see in Germany.

**Figure 10: UK utilisation for selected drugs by age 2009**

![Drugs usage by age](image)

*Source: NHS Prescribing support unit ASTRO-PUS (2009)*

**Increasing per capita drug usage for the elderly...**

Not only is it clear that the elderly use more drugs on a per capita basis than younger people, but it is clear that in countries with unrestricted access to pharmaceuticals, per capita consumption has been growing fastest in the older age cohorts. This presumably reflects both increased expectations of health amongst this age group, and the greater availability of treatments for age-related conditions. This trend is clear from data for the US and Germany (see Figure 11 and Figure 12).

**..but not in Japan, where demographic pressures are already high**

However, in Japan we have seen a decline in the value of drugs consumed by every age cohort in recent years. Making a crude adjustment to the published value data, using a deflator of average price cuts for drugs in Japan, the decline in value use is still replicated in volume declines. We estimate that 2010 volume consumption for the elderly fell back to around 1996 levels. We attribute this apparent volume decline at least in part to increased fees for visiting doctors, which tend to act as a brake on prescribing. Every two years there is both a revision of doctors’ fees as well as drug price cuts. It is worth noting that doctors’ fees and price revisions are the sole responsibility of the MHLW, but any change in the level of co-pay (currently 10% for over 70’s and 30% for others) requires legislation, and thus political action. Given the scale of future demand, we do expect increased co-pays for the elderly will be needed but do not expect any action over the next few years.

2 According to the latest stats from MHLW, FY2010 national medical expenditure was 36.6 trillion yen (about $500 billion) +3.9% from FY2009.
Figure 11: Change in per capita use over time in US

![Graph showing change in per capita use over time in US]

Source: AHRP Medical Expenditure Panel survey 1996-2008

Figure 12: Change in per capita use over time in Germany

![Graph showing change in per capita use over time in Germany]

Source: Arzneiverordnungs-Reports 2001-2010

Figure 13: Per capita use in Japan (Value)

![Graph showing per capita use in Japan (Value)]

Source: Ministry of Health & Welfare (prior to 2003 upper age cohort is age 80+, From 2003 upper age cohort is age 75+ all medicines oral+injectable)

Figure 14: Per capita use in Japan (Volume)

![Graph showing per capita use in Japan (Volume)]

Source: Ministry of Health & Welfare (prior to 2003 upper age cohort is age 80+, From 2003 upper age cohort is age 75+ all medicines oral+ injectable, Credit Suisse estimates)
Emerging markets

Most pharma companies are looking for emerging markets to drive significant growth. Every year the Credit Suisse Research Institute undertakes a significant consumer survey in a number of important emerging markets. This survey last conducted in 2010 involved almost 13,000 respondents. One of the questions was “How much does your household spend - out of pocket - on healthcare per month?” We have shown the answers based on purchasing power parity. We show two cuts of the data, one spending by income and a second expenditure by age. As the survey covered household rather than individual spending, and the cut-off for inclusion in the survey was an age of 65, it is perhaps not surprising that we did not pick up much of a trend towards increased spending by older people outside of Brazil. There is a clearer trend towards higher spending based solely on relative income levels.

Source: Credit Suisse Emerging Markets Consumer Survey 2011 Database

Figure 15: Out of pocket healthcare spending by age

Figure 16: Out of pocket healthcare spending by income

Source: Credit Suisse Emerging Markets Consumer Survey 2011 Database
Report methodology

In this report we highlight both the overall utilisation for drugs by the elderly and the specific drug areas that are over used by the elderly based on detailed information available for primary care drug use in Germany and the UK. Both Germany and the UK have effectively unrestricted access for the elderly to prescription pharmaceuticals, with either very low or no co-pays and the degree of “over use” of certain drug categories by the elderly is unsurprisingly very similar in each market.

We have used the utilisation data by age cohort for each major type of drug shown in Figure 7 and Figure 10 to assign a level of usage by the elderly for each of the 135 therapeutic categories used in our proprietary PharmaValues database. The UK and German data reflect only out-patient prescription drug use. Consequently we have used our judgement for drugs utilised largely in a hospital setting. We have used four categories in this analysis:

- **Heavily over used by the elderly.** For these drugs we see more than 90% of all German/UK use in the elderly. Examples include bisphosphonates for osteoporosis, anti-dementia drugs, Parkinson’s, arrhythmia, congestive heart failure and various hypertension drugs.

- **Over used by the elderly.** In this category more than 80% of German/UK use is in the elderly. Examples include statins for high cholesterol, anti-diabetic drugs and cancer drugs (CS estimate).

- **Average use by the elderly.** This group includes drugs where 60-80% of German/UK use is by the elderly. Examples include benzodiazepines for sleep disorders, anti depressants and anti ulcer drugs.

- **Under used by the elderly.** In this category less than 60% of German/UK use is by the elderly. Examples include oral contraceptives, anti infectives, multiple sclerosis and schizophrenia (these are grouped with the ‘average use’ in the graphs, not shown separately).

We have then shown the projected sales for each company in PharmaValues from 2009-2018, distinguishing between marketed and pipeline drugs that show 1) over use by the elderly, or 2) average or under use.
Key conclusions

SECTOR CONCLUSIONS

Overall, the EU majors have the greatest exposure to drugs used by the elderly, whilst the US and EU specialty companies have the lowest overall exposure (Figure 17). In terms of pipeline value, the US majors have the greatest exposure, with the specialty companies once again having the lowest exposure. The large contributors to EU exposure are oncology, diabetes and cardiovascular drugs. The lower exposure at the specialty companies comes from exposure to drugs for multiple sclerosis, biologics for rheumatoid arthritis and drugs for ADHD.

Figure 17: NPV for Pharma split by % utilisation by the elderly

STOCK CONCLUSIONS

- Companies with the greatest focus on the elderly, with >70% of overall value from drugs overused by the elderly, include: Amylin, Dendreon, Celgene, Roche and Novo Nordisk (largely reflecting their focus on cancer and diabetes and the high prevalence of these diseases in the elderly).

- Companies with the lowest exposure include: Medicis, Actelion, Vertex, Gilead, HGSI, Shire and Elan (all of which have product specialisations for drugs largely used outside of the elderly).
**European Major Pharma**

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- Greatest overall exposure to the elderly: Roche (cancer), Novo Nordisk (diabetes) and Novartis (hypertension/cancer). See Figure 19 for NPV exposures for each company.
- Greatest pipeline exposure: Bayer (largely Xarelto, anti-thrombosis) and Roche (cancer).
- Lowest overall NPV exposure: GSK’s major drugs are in categories not over used by the elderly such as Advair (respiratory), Benlysta (Lupus), vaccines (Engerix/Infanrix) and Augmentin (anti infectives).

We show our forecasts on how the sales exposure changes over time below.

**Figure 24: AstraZeneca**

**Figure 25: Bayer**

**Figure 26: GlaxoSmithKline**

**Figure 27: Novartis**

*Source: Company data, Credit Suisse estimates*
Figure 28: Novo Nordisk

Source: Company data, Credit Suisse estimates

Figure 29: Roche

Source: Company data, Credit Suisse estimates

Figure 30: Sanofi

Source: Company data, Credit Suisse estimates
European Specialty Pharma

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- Highest NPV exposure to the elderly: Orion (Parkinson’s).
- Lowest NPV exposure to the elderly: Shire (ADHD and enzyme replacement therapies). See Figure 20 for NPV exposures by company.
- Almirall and Elan have the highest NPV pipeline exposure to drugs over used by the elderly: Almirall from aclidinium for COPD and Elan from bapineuzumab for Alzheimer’s. The low apparent NPV for bapineuzumab reflects our low probability of success given mixed P2 results; success in this area would increase exposure significantly.

We show our forecasts on how the sales exposure changes over time below.

Figure 31: Almirall

Source: Company data, Credit Suisse estimates

Figure 32: Elan

Source: Company data, Credit Suisse estimates

Figure 33: Ipsen

Source: Company data, Credit Suisse estimates

Figure 34: Lundbeck

Source: Company data, Credit Suisse estimates
Figure 35: Meda

Source: Company data, Credit Suisse estimates

Figure 36: Merck KGaA

Source: Company data, Credit Suisse estimates

Figure 37: Orion

Source: Company data, Credit Suisse estimates

Figure 38: Recordati

Source: Company data, Credit Suisse estimates

Figure 39: Shire

Source: Company data, Credit Suisse estimates

Figure 40: UCB

Source: Company data, Credit Suisse estimates
US Major Pharmaceuticals

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- Eli Lilly and Bristol Myers have the highest NPV exposure to diseases of the elderly, Abbott and JNJ the least (Figure 18). For Lilly, the exposure reflects the NPV of Alimta (cancer), Humalog (diabetes) and Cialis (erectile dysfunction). For Bristol Myers, the major NPV contributing drugs over used by the elderly are Yervoy (cancer), Plavix (thrombosis) and Sprycel (cancer).

- Bristol Myers has the highest NPV pipeline exposure to the elderly, led by apixaban (thrombosis). Lilly also has pipeline exposure through its continued involvement in diabetes.

We show our forecasts of how the sales exposure changes over time below.

*Credit Suisse is restricted on Johnson & Johnson due to our involvement in the publicly announced proposed acquisition of Synthes. These forecasts represent expectations for sales for Johnson & Johnson's branded drug division and are on a stand alone basis.*

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**Figure 41: Abbott Labs**

Source: Company data, Credit Suisse estimates

**Figure 42: Bristol Myers Squibb**

Source: Company data, Credit Suisse estimates
Figure 43: **Eli Lilly**

Source: Company data, Credit Suisse estimates

Figure 44: **Johnson & Johnson (Restricted)**

Source: Company data, Credit Suisse estimates

Figure 45: **Merck**

Source: Company data, Credit Suisse estimates

Figure 46: **Pfizer**

Source: Company data, Credit Suisse estimates
US Specialty Pharmaceuticals

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- Alimera has the highest exposure to drugs used by the elderly, followed by Forest. Ironwood, Salix and Medicis show the least exposure. For Forest, the exposure centres on Namenda (dementia), Bystolic (hypertension) and Daliresp (COPD). See Figure 21 for the individual NPV exposures.

- Alimera has one significant late-stage asset for macular degeneration, initially targeted at diabetic macular edema. Our analysis places all of the macular degeneration products into the heavily over used by the elderly grouping. With a focus on diabetic disease rather than age-related degeneration, Alimera may have a slightly lower overall skew to the elderly.

- The lowest exposure is shown for Medicis (a largely self pay aesthetics portfolio), Ironwood (IBS drug linaclotide assumed to have only average use by the elderly) and Salix (portfolio focussed on inflammatory bowel disease).

- Allergan, whilst scoring relatively highly for diseases of the elderly through its glaucoma portfolio, also derives significant value from its self pay aesthetic drugs.

- For Salix, we have assumed that current off-label usage in IBS of Xifaxan is considered marketed (our pipeline analysis reflects a 90% probability of $720m incremental peak sales for IBS, US launch 2014E).

We show our forecasts of how the sales exposure changes over time below. Please note that we analyse only branded drug exposure here. We do not include generics drugs or medical devices, which are an important consideration for Teva and Endo investors.

_Credit Suisse is restricted on Teva due to our involvement in the publicly announced proposed acquisition of Cephalon. These forecasts represent expectations for sales for Teva’s branded drug division on a stand alone basis and are based on forecasts from May 2011 before restriction._
Figure 49: Endo

Source: Company data, Credit Suisse estimates

Figure 50: Forest Labs

Source: Company data, Credit Suisse estimates

Figure 51: Ironwood

Source: Company data, Credit Suisse estimates

Figure 52: Medicis

Source: Company data, Credit Suisse estimates

Figure 53: Salix

Source: Company data, Credit Suisse estimates

Figure 54: Teva (branded only) - data from May 2011

Source: Company data, Credit Suisse estimates
Global Biotechnology

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- Biotech companies with the greatest NPV exposure to the elderly are Amylin (diabetes), Dendreon (prostate cancer) and Celgene (multiple myeloma, through Revlimid). Amgen’s exposure comes from adjunct therapy, Neulasta and Prolia, both in cancer and for osteoporosis. See Figure 23 for overall NPV exposure by company.

- Actelion, Vertex and Gilead have the lowest exposure to drugs disproportionately used by the elderly. Actelion is geared to the PAH market, Vertex to the treatment of hepatitis C and Gilead to the treatment of HIV/AIDS.

- Amylin has the greatest NPV pipeline exposure through Bydureon for diabetes and Basilea the least (anti fungal products not over-proportionately used by the elderly).

We show our forecasts of how the sales exposure changes over time below.
Figure 59: **Celgene**

- **Source:** Company data, Credit Suisse estimates

Figure 60: **Dendreon**

- **Source:** Company data, Credit Suisse estimates

Figure 61: **Gilead**

- **Source:** Company data, Credit Suisse estimates

Figure 62: **Human Genome Sciences**

- **Source:** Company data, Credit Suisse estimates

Figure 63: **United Therapeutics**

- **Source:** Company data, Credit Suisse estimates

Figure 64: **Vertex**

- **Source:** Company data, Credit Suisse estimates
Japanese Pharmaceuticals

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- We have run the exposures based on German utilisation data, and whilst the specific products sold domestically by these companies in Japan are often quite different from other markets, we have assumed that the relative over and under use by the elderly (within therapeutic category groupings) matches that of Germany. The majority of sales exposure for this universe remains within Japan. See Figure 22 to see overall NPV exposure by company.

- There appears to be less differentiation amongst the Japanese companies than within other groups in NPV exposure. This is partly a function of the more fragmented portfolio with a higher proportion of “tail” value, which we have characterised as “average use”, and a lower overall proportion of value from separately identified drugs.

- Companies with the most exposure to the elderly are Ono, Daiichi Sankyo, Takeda and Shionogi. For Ono, the product driving exposure is Opalmon for peripheral vascular disease. Companies with the lowest exposure would appear to be Taisho, Otsuka and Mitsubishi Tanabe. Taisho has a strong reliance on anti-infectives. The major drug for Otsuka is Abilify for schizophrenia and for Mitsubishi Tanabe, Remicade for arthritis.

- Santen and Mitsubishi Tanabe have the greatest relative pipeline exposure with that of Santen skewed more to the elderly with ophthalmic drugs for glaucoma.

We show our forecasts of how the sales exposure changes over time below.

*Credit Suisse* is restricted on Takeda due to our involvement in the publicly announced proposed acquisition of Nycomed. These forecasts represent expectations for sales for Takeda on a stand alone basis.

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**Figure 65: Astellas**

**Figure 66: Chugai**

*Source: Company data, Credit Suisse estimates*
Figure 67: Daiichi Sankyo

Source: Company data, Credit Suisse estimates

Figure 68: Dainippon Sumitomo

Source: Company data, Credit Suisse estimates

Figure 69: Eisai

Source: Company data, Credit Suisse estimates

Figure 70: Kyowa Hakko Kirin

Source: Company data, Credit Suisse estimates

Figure 71: Mitsubishi Tanabe

Source: Company data, Credit Suisse estimates

Figure 72: Ono

Source: Company data, Credit Suisse estimates
Figure 73: Otsuka

![Graph showing sales trends for Otsuka](image)

Source: Company data, Credit Suisse estimates

Figure 74: Santen

![Graph showing sales trends for Santen](image)

Source: Company data, Credit Suisse estimates

Figure 75: Shionogi

![Graph showing sales trends for Shionogi](image)

Source: Company data, Credit Suisse estimates

Figure 76: Taisho

![Graph showing sales trends for Taisho](image)

Source: Company data, Credit Suisse estimates

Figure 77: Takeda (Restricted), stand alone w/o Nycomed

![Graph showing sales trends for Takeda](image)

Source: Company data, Credit Suisse estimates
Companies Mentioned  *(Price as of 13 Sep 11)*

Abbott Laboratories (ABT, $50.51, NEUTRAL, TP $47.00)
Actelion (ATLN.VX, SFr32.06, NEUTRAL, TP SFr45.00)
Allergan Inc (AGN, $78.18, OUTPERFORM, TP $91.00)
Alimera Sciences (ALIM, $7.57, OUTPERFORM, TP $13.00)
Almirall (ALM.MC, Eu5.31, NEUTRAL, TP Eu7.50)
Amgen Inc. (AMGN, $54.91, NEUTRAL, TP $59.00)
Amylin Pharmaceuticals (AMLY, $10.59, NEUTRAL [V], TP $15.00)
Astellas Pharma (4503, ¥1,329, OUTPERFORM, TP ¥1,780, MARKET WEIGHT)
AstraZeneca (AZN.L, 2738.50 p, UNDERPERFORM, TP 3000.00 p)
Basilea (BSLN.S, SFr33.00, NEUTRAL [V], TP SFr75.00)
Bayer (BAYo.Ne, Eu38.44, OUTPERFORM, TP Eu55.00)
Biogen Idec (BIIB, $91.99, OUTPERFORM [V], TP $126.00)
Bristol-Myers Squibb (BMY, $29.44, NEUTRAL, TP $32.00)
Celgene (CELG, $60.32, NEUTRAL, TP $62.00)
Chugai Pharmaceutical (4519, ¥1,329, OUTPERFORM, TP ¥1,780, MARKET WEIGHT)
Daiichi Sankyo (4568, ¥1,562, UNDERPERFORM, TP ¥1,200, MARKET WEIGHT)
Dainippon Sumitomo Pharma (4506, ¥785, NEUTRAL, TP ¥820, MARKET WEIGHT)
Dendreon Corp (DNND, $11.70, NEUTRAL, TP $14.00)
Eisai (4523, ¥2,240, NEUTRAL, TP ¥3,000, MARKET WEIGHT)
Elan Corp (ELN.I, Eu6.86, OUTPERFORM [V], TP Eu8.60)
Eli Lilly (LLY, $36.04, NEUTRAL, TP $34.00)
Endo Pharmaceuticals (ENDP, $29.70, NEUTRAL, TP $38.00)
Forest Laboratories Inc. (FRX, $32.57, OUTPERFORM, TP $46.00)
Gilead Sciences (GILD, $37.99, OUTPERFORM [V], TP $48.00)
GlaxoSmithKline (GSK.L, 1277.50 p, NEUTRAL, TP 1310.00 p)
Human Genome Sciences (HGSI, $11.49, OUTPERFORM [V], TP $27.00)
Ipsen (IPN.PA, Eu21.37, UNDERPERFORM, TP Eu21.00)
Ironwood Pharmaceuticals (IRWD, $12.17, NEUTRAL [V], TP $15.00)
Johnson & Johnson (JNJ, $63.59, RESTRICTED)
Kyowa Hakko Kirin (4151, ¥799, NEUTRAL, TP ¥870, MARKET WEIGHT)
Lundbeck (LUN.CO, Dkr103.10, UNDERPERFORM, TP Dkr97.00)
Meda (MED.AA.ST, SKr61.45, OUTPERFORM, TP SKr85.00)
Medicis Pharmaceuticals (MRX, $37.50, UNDERPERFORM, TP $31.00)
Merck & Co. (MRK, $31.74, OUTPERFORM, TP $44.00)
Merck KGaA (MRCG.DE, Eu56.82, NEUTRAL, TP Eu78.00)
Mitsubishi Tanabe Pharma (4508, ¥1,316, NEUTRAL, TP ¥1,300, MARKET WEIGHT)
Novartis (NOVN.VX, SFr47.80, OUTPERFORM, TP SFr63.00)
Novo Nordisk (NOVOb.CO, DKr625.00, NEUTRAL, TP DKr625.00)
Ono Pharmaceutical (4528, ¥4,490, NEUTRAL, TP ¥4,450, MARKET WEIGHT)
Orion (ORNAV.HE, Eu14.88, UNDERPERFORM, TP Eu15.00)
Otsuka Holdings (4578, ¥2,000, NEUTRAL [V], TP ¥2,200, MARKET WEIGHT)
Pfizer (PFE, $18.26, OUTPERFORM, TP $23.00)
Recordati (RECI.MI, Eu6.34, NEUTRAL, TP Eu8.00)
Roche (ROG.VX, SFr136.50, NEUTRAL, TP SFr150.00)
Salix Pharmaceuticals, Ltd. (SLXP, $28.73, OUTPERFORM [V], TP $44.00)
Sanofi (SASY.PA, Eu46.50, NEUTRAL, TP Eu56.00)
Santen Pharmaceutical (4536, ¥3,130, OUTPERFORM, TP ¥3,800, MARKET WEIGHT)
Shionogi (4507, ¥1,152, NEUTRAL, TP ¥1,200, MARKET WEIGHT)
Shire Pharmaceuticals (SHP.L, 1942.00 p, OUTPERFORM, TP 2280.00 p)
Taisho Pharmaceutical (4535, ¥1,824, NEUTRAL, TP ¥2,000, MARKET WEIGHT)
Takeda Pharmaceutical (4502, ¥3,715, RESTRICTED)
Teva Pharmaceutical Industries (TEVA, $37.92, RESTRICTED)
UCB (UCB.BR, Eu29.88, NEUTRAL, TP Eu22.00)
United Therapeutics Corp (UTHR, $43.30, NEUTRAL, TP $40.00)
Vertex Pharmaceuticals (VRTX, $47.78, UNDERPERFORM, TP $42.00)
Disclosure Appendix

Important Global Disclosures

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*Relevant benchmark by region: As of 29th May 2009, Australia, New Zealand, U.S. and Canadian ratings are based on (1) a stock’s absolute total return potential to its current share price and (2) the relative attractiveness of a stock’s total return potential within an analyst’s coverage universe**, with Outperformers representing the most attractive, Neutrals the less attractive, and Underperformers the least attractive investment opportunities. Some U.S. and Canadian ratings may fall outside the absolute total return ranges defined above, depending on market conditions and industry factors. For Latin American, Japanese, and non-Japan Asia stocks, ratings are based on a stock’s total return relative to the average total return of the relevant country or regional benchmark; for European stocks, ratings are based on a stock’s total return relative to the analyst’s coverage universe**. For Australian and New Zealand stocks, 12-month rolling yield is incorporated in the absolute total return calculation and a 15% and a 7.5% threshold replace the 10-15% level in the Outperform and Underperform stock rating definitions, respectively. The 15% and 7.5% thresholds replace the +10-15% and -10-15% levels in the Neutral stock rating definition, respectively.

**An analyst’s coverage universe consists of all companies covered by the analyst within the relevant sector.

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**Overweight:** Industry expected to outperform the relevant broad market benchmark over the next 12 months.

**Market Weight:** Industry expected to perform in-line with the relevant broad market benchmark over the next 12 months.

**Underweight:** Industry expected to underperform the relevant broad market benchmark over the next 12 months.

*An analyst’s coverage universe consists of all companies covered by the analyst within the relevant sector.

**The broad market benchmark is based on the expected return of the local market index (e.g., the S&P 500 in the U.S.) over the next 12 months.

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<tr>
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<th>Banking Clients</th>
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<tr>
<td>Outperform/Buy*</td>
<td>49% (61% banking clients)</td>
<td></td>
</tr>
<tr>
<td>Neutral/Hold*</td>
<td>40% (57% banking clients)</td>
<td></td>
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<tr>
<td>Underperform/Sell*</td>
<td>9% (52% banking clients)</td>
<td></td>
</tr>
<tr>
<td>Restricted</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

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