Office of Health Economics Consulting

Consulting Report

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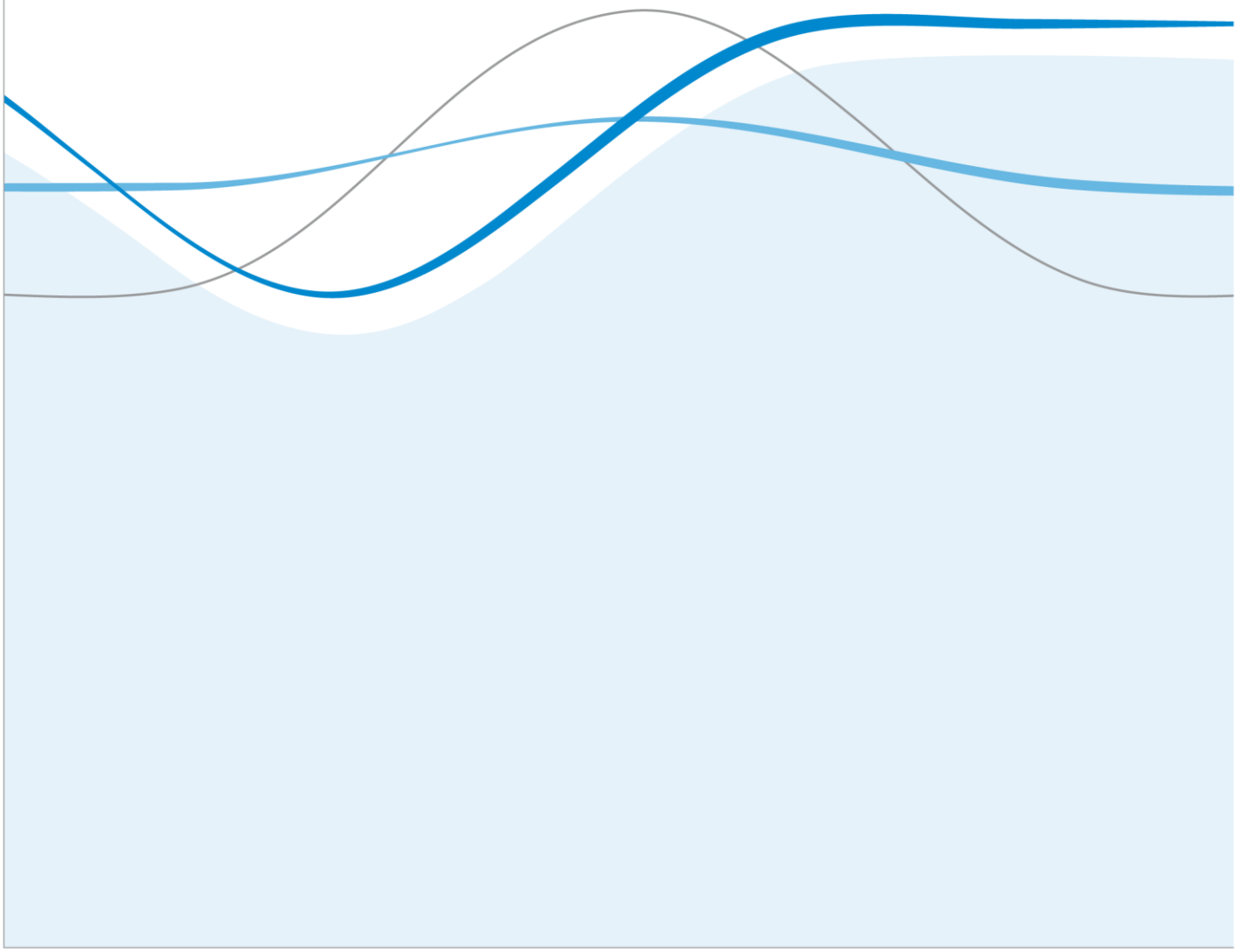

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Prepared for LIF

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TABLE OF CONTENTS

List of Abbreviations

ABPI - Association of the British Pharmaceutical Industry

ATC - Anatomic therapeutic chemical coding

DDD - Defined daily dose

DH - Department of Health (England)

DPP-4 inhibitors - Dipeptidyl peptidase-4 inhibitor medicines

DTP - Direct to Pharmacy distribution model

EphMRA - European Pharmaceutical Market Research Association

EU5 - France, Germany, Italy, Spain, UK

GLP-1 agonists - Glucagon-like peptide-1 agonist medicines

HIV - Human immunodeficiency virus

IMS - Intercontinental Medical Statistics

LIF – Läkemedelsindustriföreningen: trade association for the research-based pharmaceutical industry in Sweden

NICE - National Institute for Health and Care Excellence

NOAC - Novel oral anti-coagulant medicine

OHE - Office of Health Economics

RDS - Respiratory distress syndrome

RSV - Respiratory syncytial virus

TNF - Anti-tumour necrosis factor medicine

Wet AMD - Wet age-related macular degeneration

Executive Summary

- This report presents from a Swedish perspective an international comparison of medicines usage in high income countries that was published in a November 2014 report commissioned from the Office of Health Economics (OHE) by the Association of the British Pharmaceutical Industry (ABPI) (O'Neill and Sussex, 2014).

- In the absence of internationally comparable data on the quantities of medicines actually used by patients, usage is proxied by IMS sales volume data.

- IMS Midas data reporting sales volumes in each country were adjusted so that each class of medicines had a comparable unit of volume, for example defined daily doses (DDDs). For cancer medicines this was not possible and un-weighted ranking scores were combined. Total volume usage was adjusted for the total population in each country. Mean usage per head was calculated for the five largest EU markets and for the whole sample of comparator countries (including Sweden). Swedish usage per head was then calculated as a percent of the average of the EU5 and of all 13 comparator countries respectively. Individual country data are also presented as a ranking: a country with the highest per capita usage is given a rank of 1, the second highest has a rank of 2, and so on.

- On the basis of the same classes of medicines and the same comparator countries as in O'Neill and Sussex, 2014:

    - In 2012/13 Sweden's overall ranking across all of the medicines studied for usage per person remains 12th out of 13 high income countries;

    - Swedish usage per person is below the international average in 2012/13 for 10 out of 18 classes of medicines, and at or above the international average in eight.

- For two new sub-classes of medicines – novel oral anti-coagulants and protease inhibitors for hepatitis C – Swedish usage in 2012/13 is 34% and 80% respectively of the average of all the comparator countries.

- Results for two classes of medicines – HIV and diabetes – where there have been the greatest sales of newly launched medicines internationally in the last few years are also presented in an appendix to the report. Swedish usage of HIV medicines are a little over half the average of comparator countries. For diabetes, usage of medicines in new classes is 18% of that in the comparator countries; a third above the international average of comparator countries for insulins; and 40% of the international average for older diabetes medicines.

- In summary, the picture of Swedish usage is mixed across the different classes of medicines. In a majority of classes usage is below the two international averages. But while, for example, usage of cardiovascular medicines is low by international standards, use of cancer medicines in Sweden is close to or above the international level.

1. Introduction and Background

Medicines are an essential part of health care and new medicines are being developed all the time, leading to improvements in patient outcomes. Ensuring appropriate usage of medicines is an important part of delivering high quality health care to the population. Measuring the extent to which medicines are used in health care systems, and how that usage varies between countries, can throw light on the efficiency, quality and fairness of health services (Richards, 2010).

With that in mind, the Association of the British Pharmaceutical Industry (ABPI) commissioned the Office of Health Economics OHE to calculate the rates at which a range of medicines are used in the UK compared to in a group of other high income countries. The ABPI/OHE report was produced in co-ordination with the Department of Health in England and was published in late November 2014 (O'Neill and Sussex, 2014).

In early 2015 LIF commissioned OHE to adapt the analysis in that report so as to highlight the usage of medicines in Sweden relative to the same comparator group of high income countries, including the UK. The remainder of the present report sets out that Swedish perspective.

The 2014 analysis for the ABPI was itself an update, to financial year 2012/13 (i.e. year ending 31st March 2013), the quantitative component of the 2010 "Richards Report". The Richards Report was an earlier joint ABPI and UK Government exercise to compare the rate of medicines usage in the UK with that in comparable countries (Richards, 2010). The analysis for the Richards Report was for the financial year 2008/09 and was undertaken in 2010 by IMS. Although the Richards Report is in the public domain, the data underlying it are not. Consequently in the remainder of the current report we are able to compare Sweden's rank in terms of usage per head of population of each group of medicines – whether it was the highest, second highest, third highest, etc., among the group of comparator countries – in 2012/13 with its rank four years earlier. But we lack any other data about Sweden's usage of those medicines in 2008/09.

The rest of this report describes the method we have used to produce the quantitative analysis and the results of doing so. At appropriate points we also describe the main challenges in undertaking such comparison, owing to the limitations of the data available. We have replicated the methods used in the Richards Report in order to permit as far as possible direct comparison between the two sets of results.

Comparing the usage of any group of medicines across any group of countries is not a straightforward undertaking. The more comparator countries are involved, the greater is the complexity. This may explain the paucity of published empirical evidence on the subject. We have not been able to find any other comparisons of medicines uptake for a range of individual disease areas across a range of countries similar to that in the Richards Report, since that report was published in 2010. (Although OECD's annual "Health at a Glance" report includes indicators showing defined daily doses per 1,000 people per day for four broad disease areas – anti-hypertensives, anti-cholesterols, anti-diabetics and anti-depressants – for a number of OECD member countries, excluding Austria, New Zealand and the USA of the countries included in the Richards Report. See OECD 2013, for example.)

A wide range of factors is likely to be driving observed differences between medicines usage per head of population in Sweden and other countries. There is a large literature

on this topic but it is beyond the scope of the current report. A useful summary of the qualitative factors affecting medicines usage in different countries is in the report by Nolte and Corbett that was commissioned by the Department of Health (England) and published in November 2014 as a partner piece to O'Neill and Sussex, 2014.

2. Method

2.1 Selection of comparator countries and therapy areas

The countries for comparison were selected in the Richards Report, and hence in the present report, based on two criteria: that relatively robust data on medicines use were available and that the countries were broadly similar to the UK, and hence to Sweden, in terms of economic development. This led to a sample of 14 countries including Sweden and the UK, as listed in Table 1.

Table 1. Countries included in the Richards Report, 2010

Five large European countries	Five smaller European countries	Other countries
France Germany Italy Spain UK	Austria Denmark Norway Sweden Switzerland	Australia Canada New Zealand USA

In the present analysis we have been able to include all of these countries except Denmark, for which comparable usage data were not available for 2012/13.

The selection of therapy areas to focus on in the Richards Report took account of the following factors:

- High incidence, prevalence and/or mortality;
- Causing significant long-term morbidity;
- Incurring high levels of expenditure;
- Where significant developments in prevention or treatment had been made in the last 10 years (as at 2010);
- Affecting different age groups;
- Where medicines have been through health technology assessment processes, as well as where they have not;
- Some that are managed predominantly in primary care and others which are managed predominantly in secondary care.

The resulting list of therapy areas included is shown in Table 2 below. Appendix 2 lists the individual medicines in each therapy area.

We have analysed the same classes of medicines as in the Richards Report, but with March 2013 (rather than March 2009) as the reference date when identifying cancer drugs licensed in the past five years, six to 10 years ago, and more than 10 years ago. Classes of medicines were identified using the European Pharmaceutical Market Research Association (EphMRA) Anatomic Therapeutic Chemical (ATC) coding.

Table 2. Disease areas and categories of drugs included in the 2010 Richards Report

Condition	Category
• Cancer	Drugs licensed within the past 5 years* Drugs licensed 6–10 years ago* Drugs licensed more than 10 years ago* Hormonal treatments
• Cardiovascular(coronary heart disease and stroke)	Statins Thrombolytics, used to treat acute myocardial infarction (acute MI) Thrombolytics, used to treat stroke
• Mental health	Second-generation antipsychotics Dementia
• Long-term conditions	Multiple sclerosis Osteoporosis Rheumatoid arthritis biologics
• Infections	Hepatitis C
• Conditions affecting children	Respiratory distress syndrome (RDS) Respiratory syncytial virus (RSV)
• Other	Wet age-related macular degeneration (wet AMD)

* Based on time since UK launch as at March 2009.

We extracted sales volumes for all countries by class from IMS data (see below for more details). In many cases the portfolio of medicines for a specific class will differ between countries. There are some medicines that have not been launched in one or more of the comparator countries. But it is reasonable to match usage for the whole class as these will be the available clinical options.

We have also included in the present analysis two ATC subclasses where groups of medicines have been introduced since the publication of the Richards Report in 2010: protease inhibitors for hepatitis C and novel oral anti-coagulants (NOACs). We present these separately so as not to affect the comparison of medicines usage between 2012/13 and 2008/09.

Finally, as was requested by the ABPI for its 2014 report, we have additionally included analysis of two classes of medicines that were not included in the Richards Report: HIV and diabetes medicines. These have been analysed as they represent the two classes with the greatest (UK) sales for medicines that were launched in the five years to 2013 and were not already included in the Richards Report. The HIV and diabetes medicines analysis is in Appendix 1 to the present report.

2.2 Data used in the study

Internationally comparable data on usage of medicines are not available. We, like the Richards Report, use sales data as a proxy for usage. The source for the medicines sales data in our analysis is IMS Midas (http://www.imshealth.com/deployedfiles/imshealth/Global/Content/Information/Applications/Pharma%20Market%20Measurement/MIDAS%20Slim%20Jim%20BrEv%200113_spread_final.pdf). This database collates sales data from individual countries. In each country IMS populates the database by data collection throughout the supply chain,

including manufacturers, wholesalers and pharmacists. The data are standardised by linking national data entities to international definitions, for example local brand names are converted to an international name. This enables comparisons between countries.

The period covered for the data extract was the 12 months to March 2013, inclusive. Volume data for number of packs and weight or international units were extracted for both primary care and hospital markets, and combined. These volume data were matched to IMS salt factor data to adjust reported weight for weight of the active ingredient. In the Richards Report, IMS volume data were also used and were validated by manufacturers. The final dataset in the Richards Report comprised around 90% IMS data and 10% manufacturer data (Richards, 2010, p13). Validation of data with (and possible replacement of data by) manufacturers is a time intensive activity and was beyond the scope of the present exercise. The following results are, therefore, based 100% on IMS data.

2.3 Analysis and Presentation

The stages in our analysis, as for the Richards Report, were as follows:

1. For each medicine for each country total usage was calculated and adjusted by population. Thus we are simply presenting medicines usage per head of total population in each country.

2. Medicines were grouped using the categories in the Richards Report.

3. Population adjusted volume of sales of medicines in each category was then compared across the total sample of 13 countries and across the sub-sample of the largest five EU economies (France, Germany, Italy, Spain, UK).

4. For each category of medicines Sweden was compared with the other countries in two ways:

    I. Sweden population total usage per class (or medicine) as a percentage of average population-adjusted usage for the other 12 comparator countries, or for the EU5 (the five largest large EU economies).

    II. All countries were ranked based on total population adjusted usage, from highest to lowest, and the Swedish rank was noted.

5. A composite ranking of rankings score for each country was also calculated. The average rank score across categories for a country was calculated and this was then used to rank countries overall.

Stage 1 – For each country convert medicines usage into a population weighted usage figure:

a) For each medicine total volume of sales for each country was converted into a single measure. For example a statin with strengths of 20mg and 40mg was converted into a defined daily dose (DDD) of 20mg and each 40mg dose would have a value of two DDDs. Where a DDD was not suitable a comparable volume measure was used, generally milligrams. For each medicine total usage, by the single measure by country, was then calculated.

b) The total sales figure was divided by the total population for that country. This mitigates variation in absolute usage due to different sizes in population.

Stage 2 – Grouping medicines into categories:

a) Using the same categories as in the Richards Report, medicines were grouped using ATC classification.

b) Where usage (proxied by sales) was measured using DDDs, usage was combined for all medicines in the class.

c) Otherwise an un-weighted average of the percentage per capita use of each medicine in the group was calculated, as volumes measured in different units cannot be combined.

Stages 3, 4 and 5 – Comparing population-adjusted usage:

a) Sweden usage per capita for each group of medicines was compared with the average for the EU5 (France, Germany, Italy, Spain, UK) and for all 12 comparator countries, with Swedish usage per person expressed as % of the average of comparator countries' usage per person. (Note that Denmark, although included in the Richards Report analyses, was excluded from our analysis due to lack of up to date data.)

b) Sweden was also ranked for total usage per class compared with all other countries.

2.4 Limitations in the presentation of the analysis

In addition to the issues discussed earlier that arise from the difficulty of collecting comprehensive data, the Richards Report identified the following more general issues with the presentation of the analysis:

a) Where a medicine is used to treat more than one disease, it can be difficult to disaggregate usage. In many cases, therefore, the usage shown for a particular country may overestimate actual usage in the particular indication being studied. For the purposes of the current report this adjustment remained beyond our scope. For most classes studied this is not a major issue. But, for example, cetuximab has both cancer and non-cancer indications, but in the analyses reported in the Richards Report and here has been included under the heading of cancer. Similarly, the TNF medicines are reported as rheumatoid arthritis biologics but they are also indicated for other autoimmune diseases although not all TNFs have the same other indications.

b) Differences in dosage may explain some of the variations between countries. For example, clinicians in different countries may adopt different treatment protocols which nonetheless involve the same drug. For the Richards Report, preliminary analysis was carried out for a number of the countries by IMS Health for the dementia products, statins and second-generation antipsychotics. The differences seen did not have any explanatory power but the same may not be the case in other therapy areas.

c) The absence of a method for standardising usage for cancer products means that country-level comparisons may reveal rather less than they should. Low-volume products are given equal weighting to high-volume products. In terms of service provision, if relative usage of the high-volume product is low, this may be more significant than high relative usage of the low-volume product. Equally, if relative usage of a high-volume product is high, this may be more significant than low relative usage of a low-volume product. Our samples include medicines indicated for first line use in cancers with significant prevalence as well as those in lower prevalence cancers and used second, third or later line.

3. Results

3.1 Overview

In order to present an overall comparison of usage between countries, the Richards Report included a summary benchmark: a ranking of rankings. For each class of medicines each country is ranked according to its population adjusted usage from highest usage (rank = 1) to lowest (rank = 13, as there are 13 countries in the comparison in all). These rank numbers are then summed and a mean ranking across therapy areas is calculated for each country. A country that ranked 1 for all therapy areas would have a mean ranking of 1, for example. Thus the mean ranking can take any value from 1 to 13. The country with the highest mean ranking (= lowest average rank score) was then ranked overall first in the ranking of rankings. This mean ranking is reported at the foot of each of the Tables 3a and 3b below.

Richards noted that "In general, the picture is very varied within any individual country … with high usage in some disease areas, intermediate in others and low in others." (p18). The Richards Report cautioned against drawing conclusions about overall usage of medicines in each country. Tables 3a and 3b below compare the results from the Richards Report with our updated figures. Note that we have recalculated the 2008/09 figures from the Richards Report to exclude Denmark and thereby enable a valid comparison with the 2012/13 rankings.

Sweden's 2012/13 average ranking score of 7.8 compares with a very slightly worse score of 7.9 in 2008/09, but it has fallen one place from 11th to 12th (out of 13 countries) based on this score. Thus Sweden's mean rank score is very similar in 2012/13 and 2008/09 but its overall rank among the comparator countries has decreased by 1, as it has been overtaken by Norway.

Chart 1 simplifies the rather complicated picture presented in Tables 3a and 3b. A low mean ranking score for a country indicates that its usage of medicines is higher for the total sample of medicines relative to most or all of the other countries in the comparison. To ease interpretation we have reversed the scale on the vertical axis. Comparing the average ranking scores by country, there has been a relative decrease since 2008/09 in the score for the three highest ranked countries on the left of the chart – France, Spain and USA – and a relative increase in the next three highest ranked countries – Austria, Italy and Canada. Overall, comparing 2012/13 with 2008/09, the relative positions of the countries have not changed much but their ranking scores have converged somewhat to become more similar: there is less variation in average ranking scores across the sample of countries. What can also be seen is the relative improvement in Norway, switching positions with Sweden whose score has been almost static.

Table 3a. Summary table of international rankings by therapy area – 2008/09 and 2012/13 top 5 ranked countries and Sweden

	France		Spain		USA		Austria		Italy		**Sweden**	
	2009	2013	2009	2013	2009	2013	2009	2013	2009	2013	**2009**	**2013**
Acute MI	6	9	4	1	12	12	10	6	11	7	**5**	**11**
Antipsychotics	9	13	2	7	1	8	5	1	13	11	**12**	**12**
Dementia	2	5	3	1	1	2	5	3	12	10	**7**	**6**
Hepatitis C	3	2	2	5	6	3	4	4	1	1	**7**	**7**
Multiple sclerosis	10	7	7	10	3	5	11	11	2	3	**6**	**4**
Osteoporosis	2	7	1	2	3	10	11	5	5	4	**12**	**12**
RDS	6	6	7	9	1	1	3	4	2	5	**10**	**10**
Rheumatoid arthritis	8	6	6	7	1	4	7	12	11	11	**3**	**5**
Statins	7	3	9	8	3	1	12	11	13	10	**10**	**13**
Wet AMD	3	3	9	10	7	8	11	12	12	11	**6**	**7**
Cancer <5 years*	1	5	5	10	3	8	2	1	8	11	**7**	**6**
Cancer 6–10 years*	1	1	4	4	7	6	3	2	5	3	**10**	**8**
Cancer >10 years*	1	3	3	1	7	12	6	7	2	2	**8**	**5**
Cancer hormones	4	7	2	2	12	1	6	10	1	5	**7**	**3**
Total ranking points	63	77	64	77	67	81	96	89	98	94	**110**	**109**
Mean ranking	4.5	5.5	4.6	5.5	4.8	5.8	6.9	6.4	7.0	6.7	**7.9**	**7.8**
Overall rank	1	1	2	2	3	3	5	4	6	5	**11**	**12**

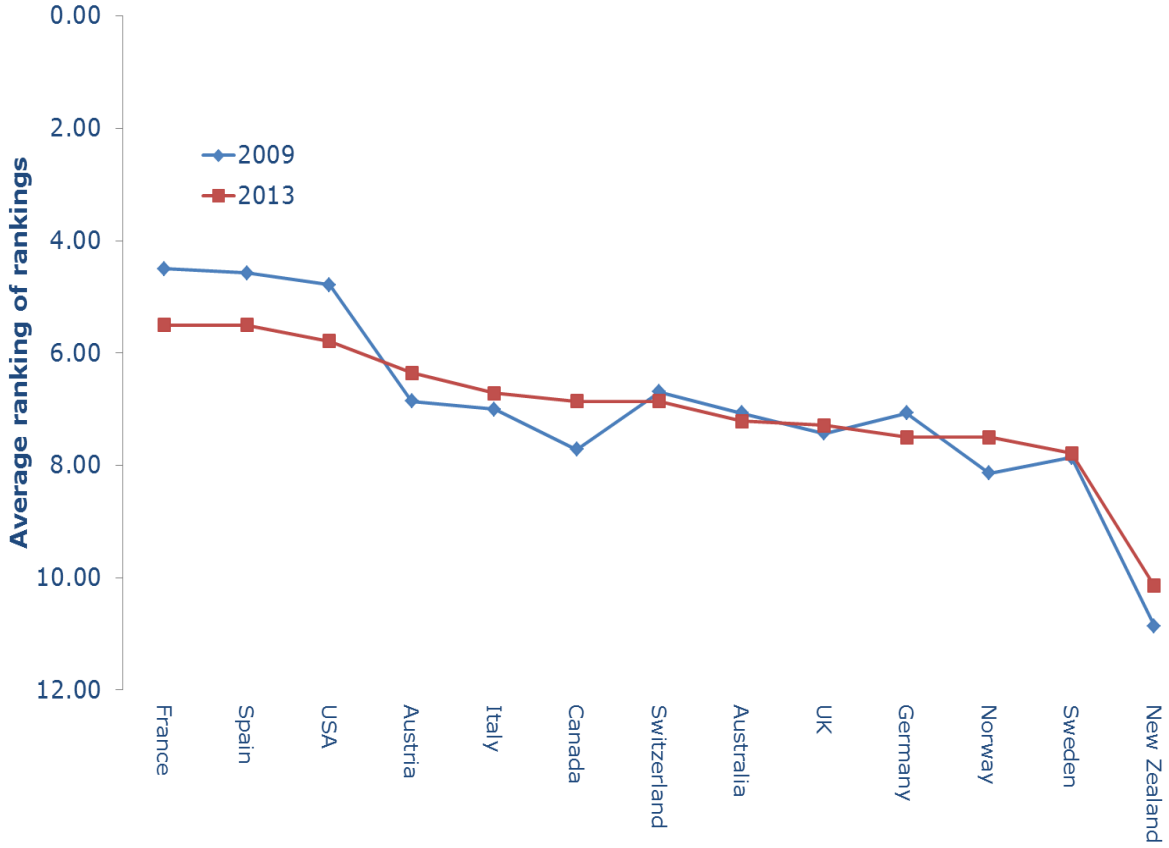
Notes:
RSV and stroke were excluded from this analysis in the Richards Report. This was due to commercial confidentiality concerns regarding data for a single medicine being presented. To ensure that results could be compared these have been excluded from the updated analysis.
* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 3b. Summary table of international rankings by therapy area – 2008/09 and 2012/13 countries ranked 6 to 13

	Canada		Switzerland		Australia		UK		Germany		Norway		**Sweden**		New Zealand	
	2009	2013	2009	2013	2009	2013	2009	2013	2009	2013	2009	2013	**2009**	**2013**	2009	2013
Acute MI	9	2	n/a	13	3	5	1	8	8	10	7	4	**5**	**11**	2	3
Antipsychotics	3	2	7	4	4	3	10	9	11	5	8	10	**12**	**12**	6	6
Dementia	4	4	9	11	11	12	10	8	8	9	6	7	**7**	**6**	13	13
Hepatitis C	11	13	9	6	5	10	13	11	8	8	10	9	**7**	**7**	12	12
Multiple sclerosis	4	9	8	2	9	8	12	12	1	1	5	6	**6**	**4**	13	13
Osteoporosis	9	1	4	9	8	6	6	3	7	11	10	8	**12**	**12**	13	13
RDS	12	13	13	12	5	3	4	2	8	8	11	11	**10**	**10**	9	7
Rheumatoid arthritis	4	1	5	3	10	9	9	8	12	10	2	2	**3**	**5**	13	13
Statins	4	6	8	2	1	5	2	4	11	12	5	7	**10**	**13**	6	9
Wet AMD	5	4	2	1	1	2	4	5	8	6	10	9	**6**	**7**	13	13
Cancer <5 years*	12	9	6	2	10	12	11	7	4	3	9	4	**7**	**6**	13	13
Cancer 6–10 years*	11	10	2	7	9	9	8	12	6	5	12	11	**10**	**8**	13	13
Cancer >10 years*	10	10	5	11	12	6	9	4	4	9	11	13	**8**	**5**	13	8
Cancer hormones	10	12	9	13	11	11	5	9	3	8	8	4	**7**	**3**	13	6
Total ranking points	108	96	87	96	99	101	104	102	99	105	114	105	**110**	**109**	152	142
Mean ranking	7.7	6.9	6.7	6.9	7.1	7.2	7.4	7.3	7.1	7.5	8.1	7.5	**7.9**	**7.8**	10.9	10.1
Overall rank	10	6	4	7	8	8	9	9	7	10	12	11	**11**	**12**	13	13

Notes:
RSV and stroke were excluded from this analysis in the Richards Report. This was due to commercial confidentiality concerns regarding data for a single medicine being presented. To ensure that results could be compared these have been excluded from the updated analysis.
* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Chart 1: Mean ranking of ranking scores by country 2008/09 and 2012/13



3.2 Results by therapy area

In the following analyses a score of 100% would mean that Swedish usage is identical to the average population weighted use for the comparator countries.

The following tables provide results for each of the individual classes of medicines in turn, in the same format as Annex 3 of the Richards Report, albeit with results for 2012/13. For each class of medicine, the first table lists the rank order of usage per capita for individual countries. This is followed by a table where Swedish usage per head of population is expressed as a percentage of that of the group of EU5 countries (France, Germany, Italy, Spain and UK) and of the average usage of all the comparator countries taken together (including Sweden).

The tables showing the details for each individual class of medicines in turn are then followed by an overall summary of Sweden's relative usage compared to the other countries and how its ranking has changed between 2008/09 and 2012/13 across all of the classes of medicines analysed.

Cancer

Table 4a. Cancer medicines 0-5 years* ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Austria	1	France
2	Switzerland	2	Austria
3	Germany	3	USA
4	Norway	4	Germany
5	France	5	Spain
6	**Sweden**	6	Switzerland
7	UK	**7**	**Sweden**
8	USA	8	Italy
9	Canada	9	Norway
10	Spain	10	Australia
11	Italy	11	UK
12	Australia	12	Canada
13	New Zealand	13	New Zealand

Table 4b. Cancer medicines 0-5 years* Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	6	103%	101%
2009	7		

* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 5a. Cancer medicines 6-10 years* ranking of usage

Rank 2013	Country	Rank 2009	Country
1	France	1	France
2	Austria	2	Switzerland
3	Italy	3	Austria
4	Spain	4	Spain
5	Germany	5	Italy
6	USA	6	Germany
7	Switzerland	7	USA
8	**Sweden**	8	UK
9	Australia	9	Australia
10	Canada	**10**	**Sweden**
11	Norway	11	Canada
12	UK	12	Norway
13	New Zealand	13	New Zealand

Table 5b. Cancer medicines 6-10 years* Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	8	67%	83%
2009	10		

* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 6a. Cancer medicines 10+ years* ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Spain	1	France
2	Italy	2	Italy
3	France	3	Spain
4	UK	4	Germany
5	**Sweden**	5	Switzerland
6	Australia	6	Austria
7	Austria	7	USA
8	New Zealand	**8**	**Sweden**
9	Germany	9	UK
10	Canada	10	Canada
11	Switzerland	11	Norway
12	USA	12	Australia
13	Norway	13	New Zealand

Table 6b. Cancer medicines 10+ years* Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	5	91%	109%
2009	8		

* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 7a. Hormonal cancer medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	USA	1	Italy
2	Spain	2	Spain
3	**Sweden**	3	Germany
4	Norway	4	France
5	Italy	5	UK
6	New Zealand	6	Austria
7	France	**7**	**Sweden**
8	Germany	8	Norway
9	UK	9	Switzerland
10	Austria	10	Canada
11	Australia	11	Australia
12	Canada	12	USA
13	Switzerland	13	New Zealand

Table 7b. Hormonal cancer medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	3	139%	149%
2009	7		

Statins

Table 8a. Statins ranking of usage

Rank 2013	Country	Rank 2009	Country
1	USA	1	Australia
2	Switzerland	2	UK
3	France	3	USA
4	UK	4	Canada
5	Australia	5	Norway
6	Canada	6	New Zealand
7	Norway	7	France
8	Spain	8	Switzerland
9	New Zealand	9	Spain
10	Italy	**10**	**Sweden**
11	Austria	11	Germany
12	Germany	12	Austria
13	**Sweden**	13	Italy

Table 8b. Statins Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	13	62%	57%
2009	10		

Acute myocardial infarction

Table 9a. Acute MI ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Spain	1	UK
2	Canada	2	New Zealand
3	New Zealand	3	Australia
4	Norway	4	Spain
5	Australia	**5**	**Sweden**
6	Austria	6	France
7	Italy	7	Norway
8	UK	8	Germany
9	France	9	Canada
10	Germany	10	Austria
11	**Sweden**	11	Italy
12	USA	12	USA
13	Switzerland	Not ranked	Switzerland

Table 9b. Acute MI Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	11	41%	44%
2009	5		

Alteplase for stroke

Table 10a. Stroke (alteplase) ranking of usage

Rank 2013	Country
1	Germany
2	**Sweden**
3	USA
4	Austria
5	Norway
6	Canada
7	UK
8	Switzerland
9	New Zealand
10	France
11	Australia
12	Spain
13	Italy

Note: In the Richards Report ranking for this medicine was not reported.

Table 10b. Stroke (alteplase) Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	2	205%	161%

Novel oral anti-coagulants

Note that this new sub-class of medicines was not in the Richards Report.

Table 11a. Novel oral anti-coagulant medicines ranking of usage

Rank 2013	Country
1	Germany
2	Canada
3	Switzerland
4	USA
5	Austria
6	France
7	Norway
8	Spain
9	**Sweden**
10	UK
11	New Zealand
12	Australia
13	Italy

Table 11b. Novel oral anti-coagulant medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	9	37%	34%

2nd generation anti-psychotics

Table 12a. 2nd generation antipsychotics medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Austria	1	USA
2	Canada	2	Spain
3	Australia	3	Canada
4	Switzerland	4	Australia
5	Germany	5	Austria
6	New Zealand	6	New Zealand
7	Spain	7	Switzerland
8	USA	8	Norway
9	UK	9	France
10	Norway	10	UK
11	Italy	11	Germany
12	**Sweden**	**12**	**Sweden**
13	France	13	Italy

Table 12b. 2nd generation antipsychotics medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	12	76%	63%
2009	12		

Dementia

Table 13a. Dementia disease medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Spain	1	USA
2	USA	2	France
3	Austria	3	Spain
4	Canada	4	Canada
5	France	5	Austria
6	**Sweden**	6	Norway
7	Norway	**7**	**Sweden**
8	UK	8	Germany
9	Germany	9	Switzerland
10	Italy	10	UK
11	Switzerland	11	Australia
12	Australia	12	Italy
13	New Zealand	13	New Zealand

Table 13b. Dementia disease medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	6	96%	100%
2009	7		

Multiple sclerosis

Table 14a. Multiple sclerosis medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Germany	1	Germany
2	Switzerland	2	Italy
3	Italy	3	USA
4	**Sweden**	4	Canada
5	USA	5	Norway
6	Norway	**6**	**Sweden**
7	France	7	Spain
8	Australia	8	Switzerland
9	Canada	9	Australia
10	Spain	10	France
11	Austria	11	Austria
12	UK	12	UK
13	New Zealand	13	New Zealand

Table 14b. Multiple sclerosis Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	4	114%	127%
2009	6		

Osteoporosis

Table 15a. Osteoporosis medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Canada	1	Spain
2	Spain	2	France
3	UK	3	USA
4	Italy	4	Switzerland
5	Austria	5	Italy
6	Australia	6	UK
7	France	7	Germany
8	Norway	8	Australia
9	Switzerland	9	Canada
10	USA	10	Norway
11	Germany	11	Austria
12	**Sweden**	**12**	**Sweden**
13	New Zealand	13	New Zealand

Table 15b. Osteoporosis medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	12	63%	68%
2009	12		

TNF medicines (TNF-alpha and others)

Table 16a. TNF medicines (TNF-alpha and others) ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Canada	1	USA
2	Norway	2	Norway
3	Switzerland	**3**	**Sweden**
4	USA	4	Canada
5	**Sweden**	5	Switzerland
6	France	6	Spain
7	Spain	7	Austria
8	UK	8	France
9	Australia	9	UK
10	Germany	10	Australia
11	Italy	11	Italy
12	Austria	12	Germany
13	New Zealand	13	New Zealand

Table 16b. TNF medicines (TNF-alpha and others) Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	5	222%	147%
2009	3		

Hepatitis C

Table 17a. Peg-interferons for hepatitis C ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Italy	1	Italy
2	France	2	Spain
3	USA	3	France
4	Austria	4	Austria
5	Spain	5	Australia
6	Switzerland	6	USA
7	**Sweden**	**7**	**Sweden**
8	Germany	8	Germany
9	Norway	9	Switzerland
10	Australia	10	Norway
11	UK	11	Canada
12	New Zealand	12	New Zealand
13	Canada	13	UK

Table 17b. Peg-interferons for hepatitis C Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	7	82%	102%
2009	7		

Note that the following new sub-class of medicines, protease inhibitors for hepatitis C, was not in the Richards Report.

Table 18a. Protease inhibitors for hepatitis C ranking of usage

Rank 2013	Country
1	USA
2	France
3	Norway
4	Austria
5	Spain
6	Germany
7	Canada
8	Switzerland
9	**Sweden**
10	UK
11	Italy
12	Australia
13	New Zealand

Table 18b. Protease inhibitors for hepatitis C Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	9	78%	80%

Respiratory distress syndrome

Table 19a. Respiratory distress syndrome ranking of usage

Rank 2013	Country	Rank 2009	Country
1	USA	1	USA
2	UK	2	Italy
3	Australia	3	Austria
4	Austria	4	UK
5	Italy	5	Australia
6	France	6	France
7	New Zealand	7	Spain
8	Germany	8	Germany
9	Spain	9	New Zealand
10	**Sweden**	**10**	**Sweden**
11	Norway	11	Norway
12	Switzerland	12	Canada
13	Canada	13	Switzerland

Table 19b. Respiratory distress syndrome Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	10	57%	59%
2009	10		

Respiratory syncytial virus

Table 20a. Respiratory syncytial virus ranking of usage

Rank 2013	Country
USA	1
Spain	2
Austria	3
Germany	4
France	5
Canada	6
Italy	7
Sweden	**8**
UK	9
Norway	10
Switzerland	11
Australia	12
New Zealand	13

Note: In the Richards Report ranking for this medicine was not reported.

Table 20b. Respiratory syncytial virus Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	8	57%	62%

Wet age-related macular degeneration

Table 21a. Wet AMD medicines ranking of usage

Rank 2013	Country	Rank 2009	Country
1	Switzerland	1	Australia
2	Australia	2	Switzerland
3	France	3	France
4	Canada	4	UK
5	UK	5	Canada
6	Germany	**6**	**Sweden**
7	**Sweden**	7	USA
8	USA	8	Germany
9	Norway	9	Spain
10	Spain	10	Norway
11	Italy	11	Austria
12	Austria	12	Italy
13	New Zealand	13	New Zealand

Table 21b. Wet AMD medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	7	85%	82%
2009	6		

3.3 Summary of the results by therapy area

The following tables and charts summarise the results across all of the medicine classes included in the exercise, comparing Swedish usage with average usage for the EU5 and for all country comparators.

Table 22. Classes of medicines where *ranked* Swedish usage is showing either an increase or no change from 2008/09 to 2012/13

	Swedish 2009 rank	Swedish 2013 rank	Swedish usage as a percentage of all countries 2013
Cancer medicines 0-5 years	7	6	101%
Cancer medicines 6-10 years	10	8	83%
Cancer medicines 10+ years	8	5	109%
Hormonal cancer medicines	7	3	149%
2nd generation antipsychotics	12	12	63%
Dementia	7	6	100%
Multiple sclerosis	6	4	127%
Osteoporosis	12	12	68%
Hepatitis C peg-interferons	7	7	102%
Respiratory distress syndrome	10	10	59%

* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 23. Classes of medicines where *ranked* Swedish usage is showing a decrease from 2008/09 to 2012/13

	Swedish 2009 rank	Swedish 2013 rank	Swedish usage as a percentage of all countries 2013
Statins	10	13	57%
Acute MI	5	11	44%
TNF medicines (TNF-alpha and others)	3	5	147%
Wet AMD	6	7	82%

* Based on time since UK launch as at March 2009 for the 2008/09 data and as at March 2013 for the 2012/13 data.

Table 24. Sub-classes where a comparison cannot be made between 2008/09 and 2012/13

	Swedish 2013 rank	Swedish usage as a percentage of all countries 2013
NOACs	9	34%
Protease inhibitors for hepatitis C	9	80%

Chart 2 plots Swedish usage relative to the EU5 group of countries (Germany, France, Italy, Spain and the UK) in 2012/13. In 2012/13 Swedish usage relative to the EU5 average was below the 100% benchmark in 13 of 18 classes of medicines and above 100% in five.

Chart 2: Swedish usage as percentage of EU5 average usage

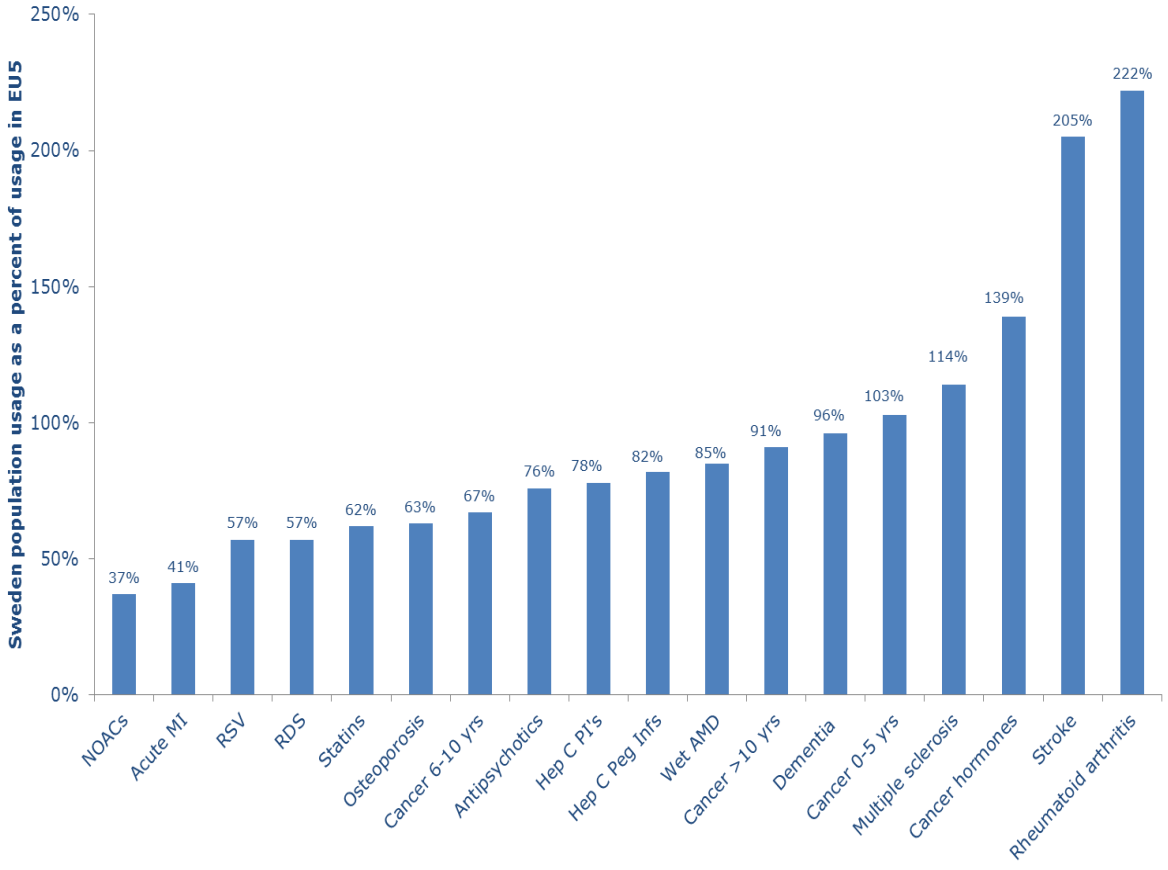
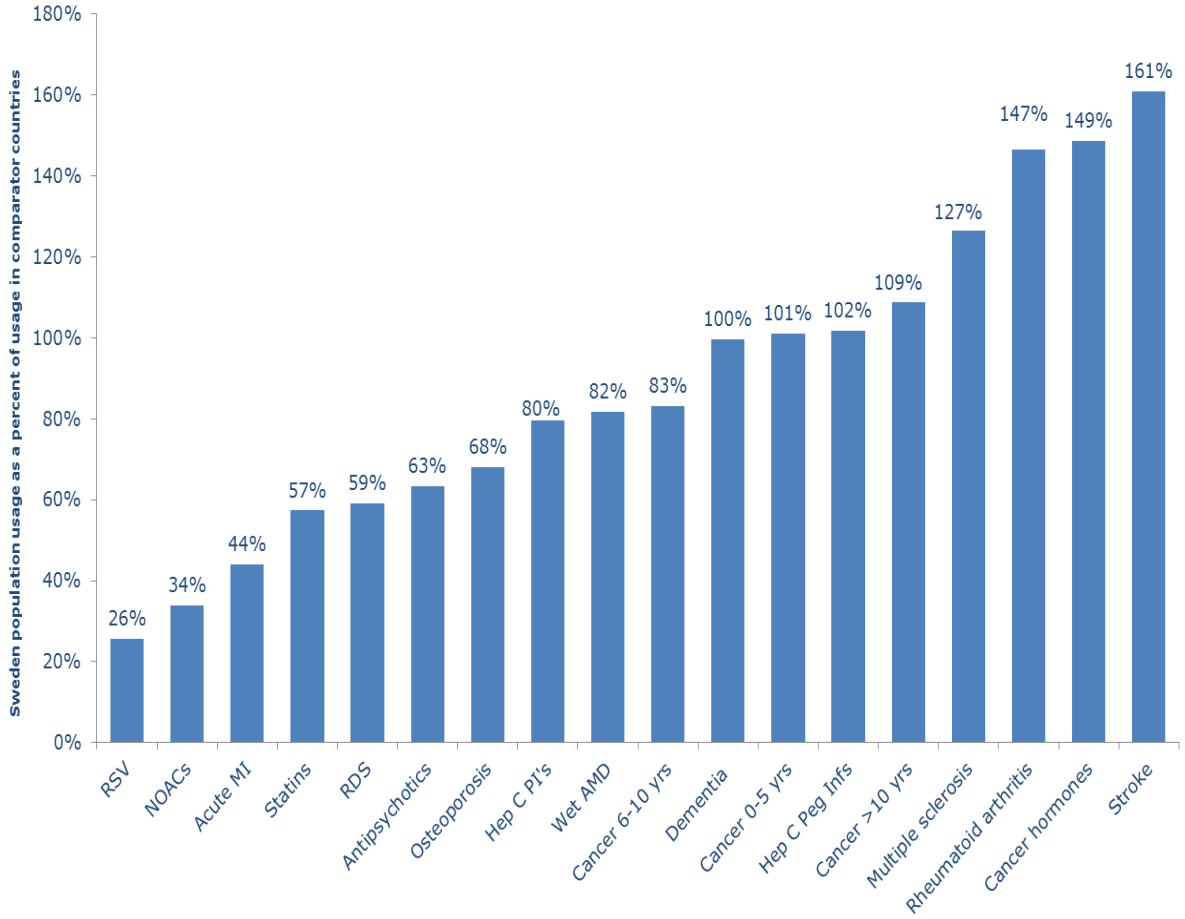


Chart 3 makes the same comparisons but between Sweden and the average of all 13 countries. In 2012/13 usage in Sweden was below the 100% international average benchmark in 10 out of 18 classes of medicines, and at or above it in 8.

Chart 3: Swedish usage as percentage of all country average



The picture of Swedish usage is mixed across the different classes of medicines. In a majority of classes usage is below the two international averages. But while, for example, usage of cardiovascular medicines is low by international standards, use of cancer medicines in Sweden is close to or above the international level.

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Appendix 1: Benchmarking usage of HIV and diabetes medicines 2012/13

The ABPI and LIF commissioned analysis of these two classes of medicines – HIV and diabetes – as there have been launches of big-selling medicines in both areas since the Richards Report analysis. Tables A1a,b present the results for HIV medicines.

For diabetes medicines, in Tables A2a,b, there have been two new classes of medicines introduced since 2009. These are Dipeptidyl peptidase-4 inhibitors (DPP-4 inhibitors) and Glucagon-like peptide-1 agonists (GLP-1 agonists), and results for these are presented separately from other anti-diabetic medicines. Insulins have also been presented separately as their use is discrete from other diabetes medicines.

Usage of HIV medicines is relatively low in Sweden. So too is usage of the newer diabetes medicines, although usage of insulins is above the international average.

Table A1a. HIV medicines ranking of usage

Rank 2013	Country
1	Spain
2	USA
3	Switzerland
4	France
5	Italy
6	UK
7	Canada
8	Australia
9	Germany
10	Norway
11	Austria
12	**Sweden**
13	New Zealand

Table A1b. HIV medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013	12	46%	56%

Table A2a. Diabetes medicines ranking of usage

Country	Insulins rank	**Country**	Other anti-diabetics rank	**Country**	DPP-4 inhibitors and GLP 1 agonists rank
Germany	1	Spain	1	Italy	1
Sweden	**2**	UK	2	Spain	2
USA	3	Italy	3	France	3
Canada	4	New Zealand	4	Germany	4
UK	5	France	5	Switzerland	5
Australia	6	USA	6	Austria	6
Norway	7	Australia	7	USA	7
Spain	8	Canada	8	Norway	8
France	9	Austria	9	Canada	9
New Zealand	10	Germany	10	Australia	10
Italy	11	Switzerland	11	UK	11
Austria	12	Norway	12	**Sweden**	**12**
Switzerland	13	**Sweden**	**13**	New Zealand	13

Table A2b. Diabetes medicines Swedish relative usage

	Sweden DDD rank	Swedish usage as a percentage of EU5 average	Swedish usage as a percentage of all countries average
2013 DPP-4 inhibitors and GLP 1 agonists	12	10%	18%
2013 insulins	2	134%	136%
2013 other medicines for diabetes	13	31%	40%

Appendix 2: List of medicines included in the analysis

Therapy area	In Richards Report 2010	Additions
Acute myocardial infarction	Reteplase	Urokinase
	Tenecteplase	
	Streptokinase	
Alzheimer's disease	Donepezil	
	Galantamine	
	Memantine	
	Rivastigmine	
	Tacrine	
Hepatitis C	Peginterferon alfa-2a	Boceprevir
	Peginterferon alfa-2b	Entecavir
Multiple sclerosis	Glatiramer acetate	
	Interferon beta-1a	
	Interferon beta-1b	
	Natalizumab	
Osteoporosis	Alendronic acid	Denosumab
	Clodronic acid (IM)	Ipriflavone
	Etidronic acid	Neridronic acid
	Ibandronic acid	Tiludronic acid
	Pamidronic acid	
	Parathyroid hormone	
	Raloxifene	
	Risedronic acid	
	Strontium ranelate	
	Teriparatide	
	Zoledronic acid	
Respiratory distress syndrome	Beractant	
	Calfactant	
	Poractant alfa	
	Surfactant (bovine lung)	
Respiratory syncytial virus	Palivizumab	
TNF medicines (TNF-alpha and others)	Abatacept	Certolizumab pegol
	Adalimumab	Golimumab

	Anakinra	Canakinumab
	Etanercept	Belimumab
	Infliximab	
	Rituximab	
	Tocilizumab	
New anti-psychotics	Amisulpride	Asenapine
	Aripiprazole	Lurasidone
	Clozapine	
	Olanzapine	
	Paliperidone	
	Quetiapine	
	Risperidone	
	Sertindole	
	Ziprasidone	
	Zotepine	
Statins	Amlodipine/atorvastatin	Ezetimibe/ atorvastatin
	Atorvastatin	
	Ezetimibe	
	Ezetimibe/simvastatin	
	Fluvastatin	
	Lovastatin	
	Lovastatin/nicotinic acid	
	Pravastatin	
	Rosuvastatin	
	Simvastatin	
	Simvastatin	
Stroke	Alteplase	Apixaban
		Rivaroxaban
		Dabigatran etexilate
Wet age-related macular degeneration	Anecortave	Aflibercept
	Pegaptanib	
	Ranibizumab	
	Verteporfin	

Cancer Medicines

In Richards Report 2010:

Cancer 0-5 years	Cancer 6-10 years	Cancer 10+ years	Cancer hormone
Bevacizumab	Alemtuzumab	Calcium folinate + levofolinate	Abarelix
Bortezomib	Bexarotene	Carboplatin	Anastrozole
Cancer drugs	Capecitabine	Carmustine	Bicalutamide
Cetuximab	Drug molecule	Chlorambucil	Bicalutamide + goserelin
Dasatinib	Ibandronic acid	Cisplatin	Buserelin
Erlotinib	Imatinib	Cyclophosphamide	Cyproterone
Lapatinib	Oxaliplatin	Docetaxel	Exemestane
Lenalidomide	Rituximab	Doxorubicin	Flutamide
Nilotinib	Tegafur	Epirubicin	Fulvestrant
Panitumumab	Tegafur uracil	Etoposide	Gonadorelin
Pemetrexed	Trastuzumab	Fludarabine	Goserelin
Sorafenib	Zoledronic acid	Fluorouracil	Goserelin + bicalutamide
Sunitinib		Gemcitabine	Letrozole
Temsirolimus		Hydroxycarbamide	Leuprorelin
Thalidomide		Idarubicin	Nafarelin
Trabectedin		Ifosfamide	Nilutamide
		Irinotecan	Tamoxifen
		Isosfamide + mesna	Triptorelin
		Lanreotide	
		Mitoxantrone	
		Octreotide	
		Paclitaxel	
		Pamidronic acid	
		Raltitrexed	
		Temozolomide	
		Topotecan	
		Vincristine	
		Vinorelbine	

Additions:

Cancer 0-5 years	Cancer 6-10 years	Cancer 10+ years	Cancer 10+ years	Cancer hormone drugs
Abiraterone Acetate	Arsenic	Alemtuzumab	Irinotecan	Abarelix
Aflibercept	Bevacizumab	Amsacrine	Isosfamide + Mesna	Anastrozole
Aminolevulinic Acid	Bortezomib	Bexarotene	Lanreotide	Bicalutamide
Axitinib	Busulfan	Bleomycin	Lomustine	Bicalutamide + Goserelin
Azacitidine	Cetuximab	Calcium Folinate + Levofolinate	Melphalan	Buserelin
Bendamustine	Cladribine	Calcium Levofolinate	Mercaptopurine	Cyproterone
Brentuximab Vedotin	Clofarabine	Capecitabine	Mitomycin	Exemestane
Cabazitaxel	Dasatinib	Carboplatin	Mitoxantrone	Flutamide
Catumaxomab	Daunorubicin	Carmustine	Nafarelin	Fulvestrant
Crizotinib	Erlotinib	Chlorambucil	Octreotide	Goserelin
Decitabine	Ibritumomab Tiuxetan	Cisplatin	Oxaliplatin	Letrozole
Eribulin	Lenalidomide	Clodronic Acid	Paclitaxel	Leuprorelin
Everolimus	Aminolevulinic Acid	Cyclophosphamide	Pamidronic Acid	Nilutamide
Gefitinib	Mitotane	Cytarabine	Pentostatin	Tamoxifen
Ipilimumab	Nelarabine	Dacarbazine	Porfimer Sodium	Triptorelin
Lapatinib	Pemetrexed	Docetaxel	Procarbazine	Celecoxib
Nilotinib	Sorafenib	Doxorubicin	Raltitrexed	Degarelix
Ofatumumab	Sunitinib	Epirubicin	Rituximab	Diethylstilbestrol
Panitumumab	Temoporfin	Estramustine	Tegafur	Fosfestrol
Pazopanib	Vindesine	Etoposide	Tegafur Uracil	Histrelin
Pertuzumab		Fludarabine	Temozolomide	Medroxyprogesterone
Regorafenib		Fluorouracil	Tioguanine	Megestrol
Ruxolitinib		Gemcitabine	Topotecan	Polyestradiol Phosphate
Tasonermin		Gonadorelin	Trastuzumab	Toremifene
Temsirolimus		Goserelin + Bicalutamide	Treosulfan	
Thalidomide		Hydroxycarbamide	Tretinoin	
Thiotepa		Ibandronic Acid	Vinblastine	
Trabectedin		Idarubicin	Vincristine	
Vandetanib		Ifosfamide	Vinorelbine	
Vemurafenib		Imatinib	Zoledronic Acid	
Vinflunine				