



Consulting Report

International Comparisons of Medicine Prices 2011 Indices Methodology and Results

Report for the ABPI

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October 2012



Acknowledgements

This report was commissioned by the Association of the British Pharmaceutical Industry (ABPI).

We are grateful for IMS Health AG and GSK for allowing us access to the IMS MIDAS database.

About OHE Consulting

Founded in 2002, OHE Consulting provides client-focused, specialised expertise on a range of health care issues and topics. We are dedicated to providing objective, independent advice to help our clients achieve their goals.

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Introduction

The Department of Health (DH) in England has published international price comparisons of branded primary care medicines in its yearly Pharmaceutical Price Regulation Scheme (PPRS) Report to Parliament since 1996 (DH, 1996). The most recent Report contains comparisons for 2010 (DH, 2012). OHE Consulting was commissioned by the Association of the British Pharmaceutical Industry (ABPI) to calculate the indices for 2011 using the same methods as the DH.

Two factors have a major effect on any international price comparison:

- The basket of medicines for which prices are compared
- The exchange rates used to convert prices to pounds sterling from a variety of local currencies

In this report, we use the same basket of medicines as the DH uses, namely the 250 branded primary care medicines with the highest sales in England in 2011¹. Medicines predominantly sold to the hospital or/and home care markets are excluded.

We have computed bilateral comparisons when the same medicine is marketed in the UK and another country, e.g. UK and France, UK and Germany, and so forth. Results of the comparison using a range of exchange rates are included.

Methods

The comparisons presented in the annual PPRS Report to Parliament have in the past been based on the top-selling branded products used in primary care in the UK. More recently the sample of drugs has been derived using England-only sales. In practice this makes very little difference. Historically, the comparisons in the PPRS Reports were based on the top-selling 150 brands; however, to increase the sample size, the DH decided to extend the list to the top 250 brands in the Eleventh Report to Parliament. This is the most recent PPRS Report published and shows price comparisons for 2004–2010.

Three steps are involved in creating the database for price comparisons: (1) identify the top-selling 250 branded drugs in England; this has always been based on Prescription Cost Analysis (PCA) data for England²; (2) identify which of these 250 branded drugs are available in the comparator countries; prices and availability of this sample of branded drugs in the comparator countries is based on the IMS MIDAS database; and (3) match the PCA data with the IMS MIDAS data.

¹ The prices used for the international comparisons are for the UK as a whole; however, the DH has recently started to select products based on sales in England only.

² Prescription Cost Analysis (PCA) provides details of the number of items and the net ingredient cost (NIC) of all prescriptions dispensed in the community in England. The drugs dispensed are listed by British National Formulary (BNF) therapeutic class. For more information on PCA data, see HSCIC (2012a).

Top-Selling 250 Primary Care Brands in England

The comparison used in the Eleventh Report to Parliament was based on the prices of the top-selling 250 branded products used in primary care in England in 2010. This selection was based on PCA data for England for 2010 using “individual preparation” level data. Our report updates the indices to 2011.

Included are all Preparation Class 3 medicines³ that are included in the PPRS⁴, which is the criterion agreed by the DH and ABPI during the 2009 PPRS negotiations. All sales by brand for existing formulations were grouped using the product label for individual preparations contained in the NHS Dictionary of Medicines and Devices (dm+d)⁵. Brands were then ranked by total 2011 net ingredient cost (NIC) in England. This created 944 individual preparations against which to match IMS data.

Matching PCA and IMS Data

For the top 250 branded products previously identified, a data extract was obtained under licence from IMS MIDAS for 2011 annual sales in local currency at current exchange rates and standard units at pack level using UK brand names. Data were supplied for the comparator countries included in the Eleventh PPRS Report to Parliament: Australia, Austria, Belgium, Finland, France, Germany, Ireland, Italy, The Netherlands, Spain, Sweden, the UK and the US. In some cases, the international brand name differed from the UK brand name; when this was the case, the data were supplied using the international name.

Matches between IMS and the dm+d data were made manually. When matching was not straightforward, as was frequently the case, we used additional sources of information to ensure a proper matching, such as the online UK medicines compendium (Datapharm, 2012), IMS DataView and companies’ websites. Of the 944 preparations in the original sample, 799 (85%) matched IMS data. For the actual bilateral comparisons, the basket of matched products from the total sample varies according to which country UK prices are being compared, as not all of the 799 preparations are available in all of the comparator countries.

Ex-factory prices have been used for the international price comparisons because that is the basis for the IMS data. These prices exclude tax.

Prices

The Eleventh PPRS Report to Parliament undertook bilateral comparisons, where matches were found between the UK and each of the other countries. Thus, the sample of brands among the top 250 that are included in the UK–Germany comparison may well differ from the sample used in the UK–Italy comparison, although substantial overlap is likely. Previous PPRS Reports to Parliament also included multilateral comparisons, where products included in the comparisons were restricted to those that were available in *all* of the comparator countries. This latter approach yields a smaller

³ Preparation Class 3 medicines are defined as drugs prescribed and dispensed by proprietary brand name. Class 2 medicines, defined as drugs prescribed generically but only available as a proprietary product, are identified separately in PCA data and are a subset of Class 3 in the data.

⁴ See Appendix 1 for a list of the branded drugs not included in the PPRS.

⁵ The NHS Dictionary of Medicines and Devices provides a “stable, unique term (description) and identifier (code) for all medicines and devices used in the treatment of patients” (CME, 2012).

sample too limited to allow for robust comparisons across countries, especially as the list of comparator countries has expanded over the years.

The bilateral price indices (based on the UK = 100) are weighted by the volume of each drug in primary care in England, i.e. indices show weighted average prices and the weights used are volumes in England. As the Eleventh PPRS Report to Parliament notes: “the index indicates what expenditure would have been if the sample of products compared were purchased at the prices existing in the comparator countries” (DH, 2012, page 27).

IMS prices for all countries used in the comparisons, including the UK, were calculated by dividing sales values in local currency by numbers of standard units sold. This volume unit of measurement is closest to the volume measurement “quantity” in PCA data. The alternative approach would be to use packs as the volume measure, but this produces more issues when comparing PCA and IMS data from different countries as pack sizes vary across countries.

To match the DH approach, a further refinement was made: we excluded individual preparations where the IMS price in the UK was 25% higher or lower than the PCA price. This is because we believe the PCA price produces results closer to the actual ex-factory price than does the IMS price. An important reason for differences between IMS and PCA prices is that the two often use different definitions of a unit of quantity for the same preparation.

The PCA price is the list price; following the practice of the DH, we further discounted the PCA price for this comparison by 12.5% to take into account the wholesale margin and estimate an ex-factory price.

Data from the Health and Social Care Information Centre (HSCIC, 2012b) were used to estimate the value of the market for branded medicines in England. This was compared to the value of sales for each sample by country. The result creates a view of the coverage of the sample by country, shown in Table 1. Thus, for example, the medicines it proved possible to use for the UK–Germany price comparison accounted for 58% of total primary care branded sales in 2011 in England.

For each bilateral comparison basket, a weighted average price was calculated by multiplying the price in local currency by PCA volume sales (i.e. sales in England) for each comparator country and dividing by total volume for the sample. This creates an average weighted price in local currency. For consistency with the PPRS Reports to Parliament, we used the relevant average exchange rates in Q4 of 2011 to convert from local currencies to pounds sterling. As in the PPRS Reports to Parliament we use market exchange rates rather than purchasing power parity (PPP) rates, as the purpose of the exercise is to show what the UK NHS would pay for its medicines were they priced at the levels evident in the comparator countries.

Table 1. Value of sales in sample for each bilateral comparison as a share of total branded sales in England 2011

Country	Share of total branded NIC
Australia	51%
Austria	53%
Belgium	44%
Finland	54%
France	54%
Germany	58%
Ireland	60%
Italy	50%
Netherlands	56%
Spain	50%
Sweden	57%
US	40%

Note: NIC = net ingredient cost

Source: OHE Consulting calculation using source data from IMS Health AG and the Health and Social Care Information Centre

Results

Table 2 shows the results for price comparisons for 2011. Table 2 also includes results published in the Eleventh PPRS Report to Parliament for the period 2005–2010 (DH, 2012).

Table 2. Bilateral comparisons of ex-manufacturer prices (2005–2011)

	2005	2006	2007	2008	2009	2010	2011	2011 indices using five-year average exchange rate
Australia			94	94	126	139	143	120
Austria	96	94	96	111	125	117	115	112
Belgium	95	97	101	122	132	122	123	119
Finland	101	96	99	119	113	105	103	100
France	96	89	92	108	115	104	104	101
Germany	108	105	113	142	169	155	153	148
Ireland	103	105	112	134	144	133	123	119
Italy	84	78	83	101	120	113	101	98
Netherlands	95	94	99	115			117	113
Spain	84	85	88	109	118	106	101	98
Sweden		103	105	116	126	130	134	123
UK	100	100	100	100	100	100	100	100
US	198	188	183	252	249	281	331	313

Note: Blank cell = data not available

Source: “2005–2010” are from DH (2012); “2011” and “2011 indices using five-year average exchange rate” are OHE Consulting calculations using source data from IMS Health AG and PCA data

Column 8 (“2011”) shows the 2011 results using the average exchange rates for Q4 2011. Column 9 (“2011 indices using 5-year average exchange rate”) shows the 2011 indices using the average Q4

exchange rates for the five years 2007 to 2011 inclusive. Indices using five-year average exchange rates smooth out the year-by-year volatility of exchange rates and also are reported in the PPRS Report to Parliament.

Table 3 shows the exchange rates used for Table 2.

Table 3. Exchange rates used for 2011 indices

£1 = each of the currencies	Q4 2011	Average Q4 rates 2007-11
Australian dollar	1.55	1.92
Euro	1.17	1.21
US dollar	1.57	1.68
Swedish krona	10.60	11.62

Source: Bank of England, 2012

Appendix 2 shows the results for annual indices from various Reports to Parliament from 2000 onwards, including the 2011 indices. Appendix 3 shows bilateral comparisons based on five-year average exchange rates published in various Reports to Parliament, when available.

Exchange rates are a key factor in international price comparisons. For this reason, a sensitivity analysis was carried out using different exchanges rates to convert national prices of the 2011 basket of matched products to UK prices. We used four different averages of spot exchange rates, as reported by the Bank of England (2012), to convert local currency 2011 prices into pounds sterling: average Q4 2007, average Q4 2008, average Q4 2009 and average Q4 2010. Table 4 shows the results.

Table 4. Sensitivity analysis: 2011 price indices relative to UK=100 using different exchange rates

Q4 exchange rate used	2007	2008	2009	2010	2011
Australia	97	95	124	139	143
Austria	95	112	121	115	115
Belgium	101	120	129	123	123
Finland	85	101	109	103	103
France	86	102	110	104	104
Germany	126	149	161	153	153
Ireland	101	120	129	123	123
Italy	84	99	107	102	101
Netherlands	96	114	123	117	117
Spain	83	98	106	101	101
Sweden	108	116	124	132	134
US	254	330	318	329	331
UK	100	100	100	100	100

Note: The last column ("2011") is the same as column 2 in Table 2

Sources: OHE Consulting calculation using source data from IMS Health AG and PCA data

Exchange rates: Bank of England (2012). "2007" = 2011 price index based on average Q4 2007 exchange rates, "2008" = 2011 price index based on average Q4 2008 exchange rates and so on, up to "2010" = 2011 price index based on average Q4 2010 exchange rates

Table 5 shows the exchange rates used for Table 4.

Table 5. Exchange rates

£1 = each of the currencies	Q4 2007	Q4 2008	Q4 2009	Q4 2010	Q4 2011
Australian dollar	2.30	2.34	1.80	1.60	1.55
Euro	1.41	1.20	1.11	1.16	1.17
US dollar	2.05	1.57	1.63	1.58	1.57
Swedish krona	13.12	12.23	11.44	10.73	10.60

Source: Bank of England (2012)

Discussion

In the early 2000s, UK prices included in the annual PPRS Report to Parliament were among the highest relative to the comparator countries (see Appendix 2 for details). From 2007 to 2008, however, there was a significant drop in the UK ranking, from mid-position to bottom range. This paper does not explore the reasons for this change in rankings, as multiple factors come into play. Undoubtedly, however, a part of this change in the UK ranking is due to exchange rate movements. The pound depreciated 15% in one year against the euro between Q4 2007 and Q4 2008, falling from £1 = €1.41 in Q4 2007 to £1 = €1.20 in Q4 2008 (Bank of England, 2012). In 2010 and 2011, the UK medicines price index was still in the bottom range, partly because the pound stayed low against the euro.

Relative to the UK index of 100, primary care medicines price indices for all countries have risen since 2000. The US position consistently is the highest. Sweden's index also has risen consistently since 2006, when that country first was introduced in the PPRS Report to Parliament comparisons. This corresponds with a progressive depreciation of the pound against the Swedish krona, falling from £1 = SKr13.57 in Q4 2006 to £1 = SKr10.60 in Q4 2011 (Bank of England, 2012). Australia's index also has seen a significant rise relative to the UK index, from 94 in 2007 to 143 in 2011. This matches almost exactly the fall in the value of the pound relative to the Australian dollar over the same period, from £1 = Aus\$2.34 in Q4 2008 to £1 = Aus\$1.55 in Q4 2011 (Bank of England, 2012).

Conclusions

The objective of this work has been to update the international price comparisons for 2011, given that the latest PPRS Report to Parliament only provides results to 2010. Based on our analysis, prices in 2011 for the leading branded medicines in primary care in the UK were still in the bottom quartile.

International price comparisons are not straightforward⁶. Many issues and factors determine how prices of medicines in the UK compare to those in the rest of the world. There is no single, perfect method for analysing price differences across countries, but some methods are more appropriate than others and depend on the objective of the comparison.

⁶ For a thorough discussion of international price comparisons, including both results and methodological issues, see Danzon and Chao (2000), Danzon and Kim (2002) and Appendix 4.

Appendix 1. Branded Products Not Included in the PPRS

Classes for which all products are excluded

BNF Section Name	BNF Sub-Paragraph Name	BNF Chapter	BNF Section	BNF Para	BNF Sub-Para
Stoma Care	Local Care of Stoma	1	8	1	0
Oxygen	Oxygen	3	6	0	0
Drugs Used In Diabetes	Screening and Monitoring Agents	6	1	6	0
Oral Nutrition	Foods For Special Diets	9	4	1	0
Oral Nutrition	Enteral Nutrition	9	4	2	0
Minerals	Dolomite	9	5	4	3
Minerals	Kelp	9	5	4	4
Bitters And Tonics	Bitters And Tonics	9	7	0	0
Foods	Foods	9	9	0	0
Compound Vit/Mineral Formulations	Compound Vit/Mineral Formulations	9	10	0	0
Health Supplements	Amino Acids & Nutritional Agents	9	11	1	0
Health Supplements	Enzymes	9	11	2	0
Health Supplements	Glandular	9	11	3	0
Health Supplements	Digestive Aids	9	11	4	0
Other Health Supplements	Other Health Supplements	9	12	0	0
Contact Lenses	Contact Lenses	11	9	0	0
Sunscreens And Camouflagers	Sunscreening Preparations	13	8	1	0
Sunscreens And Camouflagers	Camouflagers	13	8	2	0
Miscellaneous Topical Preparations	Miscellaneous Topical Preparations	13	15	0	0
Alcohol, Wines & Spirits	Alcohol, Wines & Spirits	19	1	0	0
Selective Preparations	Individually Formulated Preps-Bought In	19	2	1	0
Selective Preparations	Individ Formulated Preps-Prepared Extemp	19	2	2	0
Selective Preparations	Homoeopathic Preparations	19	2	3	0
Selective Preparations	Denture Fixatives	19	2	5	1
Selective Preparations	Household & Other Over The Counter Lines	19	2	5	0
Selective Preparations	Insect Repellents	19	2	5	2
Selective Preparations	Toiletries	19	2	5	5
Acids	Acids	19	6	0	0
Acids	Concentrated Waters	19	6	1	0
Acids	Extracts	19	6	3	0
Acids	Oils	19	6	5	0
Acids	Tinctures	19	6	6	0
Acids	Syrups	19	6	7	0
Base/Dil/Susp Agents/Stabilisers	Base/Dil/Susp Agents/Stabilisers	19	7	0	0
Colouring, Flavouring & Sweetening Agents	Colouring, Flavouring & Sweetening Agents	19	8	0	0
Disinfectants, Preservative & Sterilising Agents	Disinfectants, Preserv & Sterilising Agents	19	9	0	0

Lubricating Jellies/Pessaries	Lubricating Jellies/Pessaries	19	11	0	0
Electrode/Ultrasonic Gels	Electrode/Ultrasonic Gels	19	12	0	0
Cordials/Soft Drinks	Cordials/Soft Drinks	19	13	0	0
Waters	Sterile Water	19	14	1	0
Waters	Purified Water	19	14	2	0
Waters	Spring/Mineral & Soda Waters	19	14	4	0
Other Gases	Other Gases	19	15	0	0
Adhesive		23	10	1	0
(Pastes/Sprays/Solutions)					
Adhesive		23	10	29	5
(Pastes/Sprays/Solutions)					
Adhesive		23	10	41	0
(Pastes/Sprays/Solutions)					
Adhesive Removers		23	15	1	0
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	9	0
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	10	0
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	33	6
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	33	7
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	34	5
(Sprays/Liquids/Wipes)					
Adhesive Removers		23	15	41	0
(Sprays/Liquids/Wipes)					
Deodorants		23	45	1	0
Deodorants		23	45	6	0
Deodorants		23	45	7	0
Deodorants		23	45	9	0
Deodorants		23	45	10	0
Deodorants		23	45	14	5
Deodorants		23	45	22	5
Deodorants		23	45	27	0
Deodorants		23	45	33	6
Deodorants		23	45	33	7
Deodorants		23	45	34	5
Deodorants		23	45	41	0
Deodorants		23	45	44	0
Deodorants		23	45	48	8
Deodorants		23	45	50	3
Deodorants		23	45	58	5
Discharge Solidifying Agents		23	46	6	0
Discharge Solidifying Agents		23	46	33	6
Irrigation Washout Appliances		23	70	1	0
Skin Fillers And Protectives		23	80	1	0
Skin Fillers And Protectives		23	80	6	0
Skin Fillers And Protectives		23	80	7	0
Skin Fillers And Protectives		23	80	9	0
Skin Fillers And Protectives		23	80	10	0
Skin Fillers And Protectives		23	80	27	5
Skin Fillers And Protectives		23	80	29	5
Skin Fillers And Protectives		23	80	31	0
Skin Fillers And Protectives		23	80	33	6

Skin Fillers And Protectives	23	80	33	7
Skin Fillers And Protectives	23	80	34	5
Skin Fillers And Protectives	23	80	41	0
Skin Fillers And Protectives	23	80	48	0
Skin Fillers And Protectives	23	80	48	8
Skin Fillers And Protectives	23	80	58	5

Appendix 2. Bilateral Comparisons: Annual Indices, 2000–2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Australia								94	94	126	139	143
Austria	77	81	86	94	94	96	94	96	111	125	117	115
Belgium	78	81	86	91	90	95	97	101	122	132	122	123
Finland	83	84	88	98	96	101	96	99	119	113	105	103
France	80	81	81	91	84	96	89	92	108	115	104	104
Germany	91	94	95	102	106	108	105	113	142	169	155	153
Ireland	83	88	83		99	103	105	112	134	144	133	123
Italy	79	82	86	90	90	84	78	83	101	120	113	101
Netherlands	81	84	88	93	92	95	94	99	115			117
Spain	64	67	75	81	80	84	85	88	109	118	106	101
Sweden							103	105	116	126	130	134
UK	100	100	100	100	100	100	100	100	100	100	100	100
USA	209	217	291	190	176	198	188	183	252	249	281	331

Note: Blank cell = data not available

Sources: 2004–2010 are from DH (2012); 2000–2003 are from DH (2001); 2011 are OHE Consulting calculations using source data from IMS Health AG and PCA data

Appendix 3. Bilateral Comparisons Based on Five-Year Average Exchange Rates

	1999-2003	2000-2004	2004-2008	2006-2010	2007-2011
Australia			93	106	120
Austria	86	87	94	107	112
Belgium	83	84	102	112	119
Finland	90	89	100	96	100
France	84	78	91	95	101
Germany	94	98	119	142	148
Ireland			112	122	119
Italy	83	72	84	103	98
Netherlands	85	86	96		113
Spain	74	74	91	97	98
Sweden			107	114	123
UK	100	100	100	100	100
USA	210	192	212	254	313

Note: blank cell = not available

Sources: 1999–2003 are from DH (2005); 2000–2004 are from DH (2006); 2004–2008 are from DH (2009); 2006–2010 are from DH (2012); 2007–2011 are OHE Consulting calculations using source data from IMS Health AG and PCA data

Appendix 4. Factors Affecting International Price Comparisons

Price comparisons are affected by a number of factors, such as changes in prices over time, product volumes, exchange rates, and product mix, which changes as new products and generic versions of older products enter the market. Exchange rate movements in particular can have an important effect.

Parameters to be considered in the construction of price indices are numerous and the price index will be affected by how each is specified. The key considerations include:

- What is the size and composition of the sample of products for which prices are to be compared? Will all medicines be included or only a selected sample and how/why is that sample chosen?
- Are prices to be compared at pack or dose level, as typical dose levels may vary between countries?
- What type of price index is to be constructed?
- Are weights to be included, and if so, which country will be used as reference?
- Which price will be used – ex-factory or list price? Will tax be included? How will non-linear rebates/clawbacks affect prices?
- What markets will be included: primary care and/or hospital products? Will brands and generics both be included?
- What exchange rate will be used?
- What time period will be used to construct the indices?

An important additional issue is whether the objective of the study is to carry out bilateral or multilateral comparisons. There is a trade-off between breadth of comparison and size of sample. In multilateral comparisons, examples of medicines available in the same form in all countries are rare and so sample sizes are small; in bilateral studies, the sample is larger but comparisons obviously are limited to the two countries.

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