

Finalised Patient Reported Outcome Measures (PROMs) in England

April 2010 to March 2011
Pre- and post-operative data

Contents

Contents	2
Executive summary	3
Background	4
Data Quality	5
Coverage	5
Overall coverage	6
Participation and linkage	9
Questionnaire Validity	11
Results	15
Overall changes in scores	15
Success and satisfaction of surgery	21
Distribution of scores	23
Organisation-level analysis	28
Outliers	28
Adjusted health gain	28
Annex 1 – Interpreting box plots	29

Executive summary

For the 2010-11 coverage period:

Participation and coverage

- There were 245,516 eligible hospital episodes¹ and 171,499 pre-operative questionnaires returned - a headline participation rate of 69.9% (66.1% for 2009-10).
- For the 171,499 pre-operative questionnaires returned, there were 162,614 post-operative questionnaires sent out², of which 131,696 have been returned - a return rate of 81.0% (80.0% for 2009-10).

Scores

- Comparing pre- and post-operative 'EQ-5D Index' scores (a combination of five key criteria concerning patients' self-reported general health), an increase in general health was recorded for:
 - 86.7% of hip replacement respondents (87.2% for 2009-10)
 - 77.9% of knee replacement respondents (77.6% for 2009-10)
 - 51.6% of varicose vein respondents (52.4% for 2009-10)
 - 50.5% of groin hernia respondents (49.3% for 2009-10)
- Comparing pre- and post-operative 'EQ-VAS' values (the current state of the patient's self-reported general health), an increase in general health was recorded for:
 - 61.4% of hip replacement respondents (61.4% for 2009-10)
 - 50.8% of knee replacement respondents (50.2% for 2009-10)
 - 39.8% of varicose vein respondents (40.4% for 2009-10)
 - 39.1% of groin hernia respondents (38.2% for 2009-10)
- Comparing pre- and post-operative responses to condition-specific questions, improvements in patients' conditions were recorded for:
 - 95.8% of hip replacement respondents (95.7% for 2009-10) ['Oxford Hip Score']
 - 91.4% of knee replacement respondents (91.4% for 2009-10) ['Oxford Knee Score']
 - 82.5% of varicose vein respondents (83.4% for 2009-10) ['Aberdeen Varicose Vein Questionnaire']
 - [There is no condition-specific scoring for groin hernia patients.]

Outliers

Average health gains for 56 healthcare providers were identified as outliers – 21 having average scores significantly higher than expected and 35 significantly worse – when compared to the national average using a statistical model which accounts for the providers' differing case-mix.

¹ Episodes in the Hospital Episodes Statistics data warehouse clinically coded with hip, knee, varicose vein or groin hernia procedure codes which make them suitable for inclusion in PROMs. Patients can undergo more than one different PROMs procedure in a single eligible episode and those episodes will have been counted here twice; this affects 73 of the 245,516 episodes.

² Not every pre-operative questionnaire has a corresponding post-operative questionnaire sent out for various reasons including the cancellation of an operation or the death of the patient.

Background

Since April 2009, English providers of NHS healthcare have been inviting patients undergoing four common surgical procedures (groin hernia, hip replacement, knee replacement and varicose vein surgeries) to complete pre-operative questionnaires on their general and condition-specific health. The responses to these questionnaires have been analysed along with responses to post-operative questionnaires in order to assess the outcomes of the surgical procedures based on patients' self-reported health status.

Where possible, PROMs questionnaires have been linked to records of hospital inpatient activity ('HES episodes') in order to deliver a richer dataset for analysis.

The PROMs Guide

The [PROMs Guide](#)

[<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1295>]
is available as a reference document, with further information on:

- the background to the PROMs programme
- overview of the PROMs dataset and collection process
- scoring and matching methodologies.

Answers to some of the more common questions on PROMs can be found in the [PROMs FAQs](#).
[<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1433>]

For more details on and further analysis from the wider Hospital Episode Statistics ('HES') data warehouse, please visit [HESonline](#).

[<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937>]

Data Quality

In addition to the findings presented in this section, a detailed data quality note has been [published alongside this report](http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1582) [http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1582]

Coverage

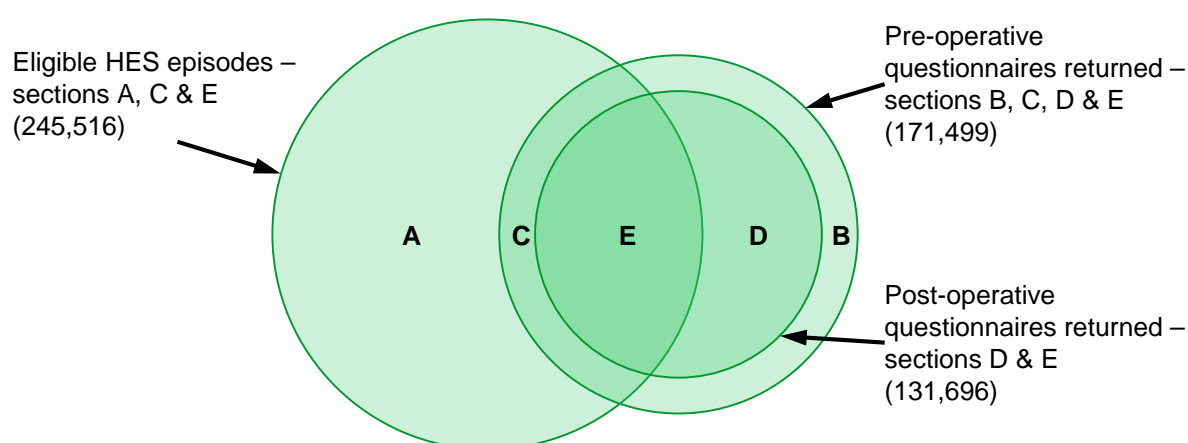
Analysis in this report is based on:

- Episodes of inpatient hospital care ('HES episodes') with a PROMs-eligible procedure recorded, where the episode started between 1 April 2010 and 31 March 2011.
- Pre-operative patient questionnaires with a completion date between 1 April 2010 and 31 March 2011 which were returned and scanned prior to the end of June 2012. Some patients did not record their questionnaire completion date; for these questionnaires, the date that the questionnaire was scanned after it was returned has been used instead.
- Post-operative questionnaires which were sent out, returned and scanned prior to the end of June 2012 and which linked to a pre-operative questionnaire.

All English providers treating NHS patients have been asked to collect pre-operative questionnaires from patients who wish to participate in PROMs. Post-operative questionnaires are sent to and returned by patients following their surgery. Not all patients undergoing the relevant operations returned questionnaires – the reasons for this are not known, but patients are not obliged to complete or return their questionnaires and some will have chosen not to do so.

The relationship between HES episodes and questionnaires is illustrated in **Figure 1**. The three circles represent eligible HES episodes (the large circle on the left), completed pre-operative questionnaires (the large circle on the right) and returned post-operative questionnaires (the smaller circle on the right). The overlapping of the circles illustrates participation and return rates, and the rate of questionnaire-episode linkage.

Figure 1: Summary of the relationships between HES episodes and pre- and post-operative questionnaires [not to scale]



- A – Eligible HES episodes not linked to a PROMs pre-operative questionnaire (113,754)³
- B – Pre-operative questionnaires not linked to an eligible HES episode and for which a post-operative questionnaire has not been returned (16,021)
- B & D – Pre-operative questionnaires not linked to an eligible HES episode (39,737)

³ Note that some 2010-11 questionnaires would have linked to other years' HES episodes – for clarity, these are not shown in Figure 1.

- C – Pre-operative questionnaires linked to an eligible HES episode but for which a post-operative questionnaire has not been returned (23,782)
- C & E – Pre-operative questionnaires linked to an eligible HES episode (131,762)³
- D – Post-operative questionnaires returned not linked to an eligible HES episode (23,716)
- D & E – All returned post-operative questionnaires (completed questionnaire pairs) (131,696)
- E – Completed questionnaire pairs linked to an eligible HES episode (107,980)

Overall coverage

The 5 charts below show, for both 2009-10 and 2010-11, the number of eligible HES episodes, pre- and post-operative questionnaires and linked pre- and post-operative questionnaires. For all five measures, there is a clear seasonal pattern, with a small peak in March, a marked dip in December and the winter months and a smaller summer dip. It is not known why this is the case, but December and mid-summer dips would be expected given that PROMs procedures are elective surgeries which patients might be disinclined to undergo during the summer or around Christmas; it may also be that hospitals would prefer not to schedule so many of these surgical procedures during these times owing to staffing constraints and the need to prioritise emergency admissions.

Note that the month in **Chart 2 to Chart 5** for pre- and post-operative questionnaires and linked questionnaires is the month of the pre-operative questionnaire completion date. The relatively low number of questionnaires shown for April 2009 is likely to be largely a result of that month being the first of the PROMs programme in its current form.

Chart 1: Number of eligible HES episodes by month in 2009-10 and 2010-11 (Note: vertical axis starts at 12,000)

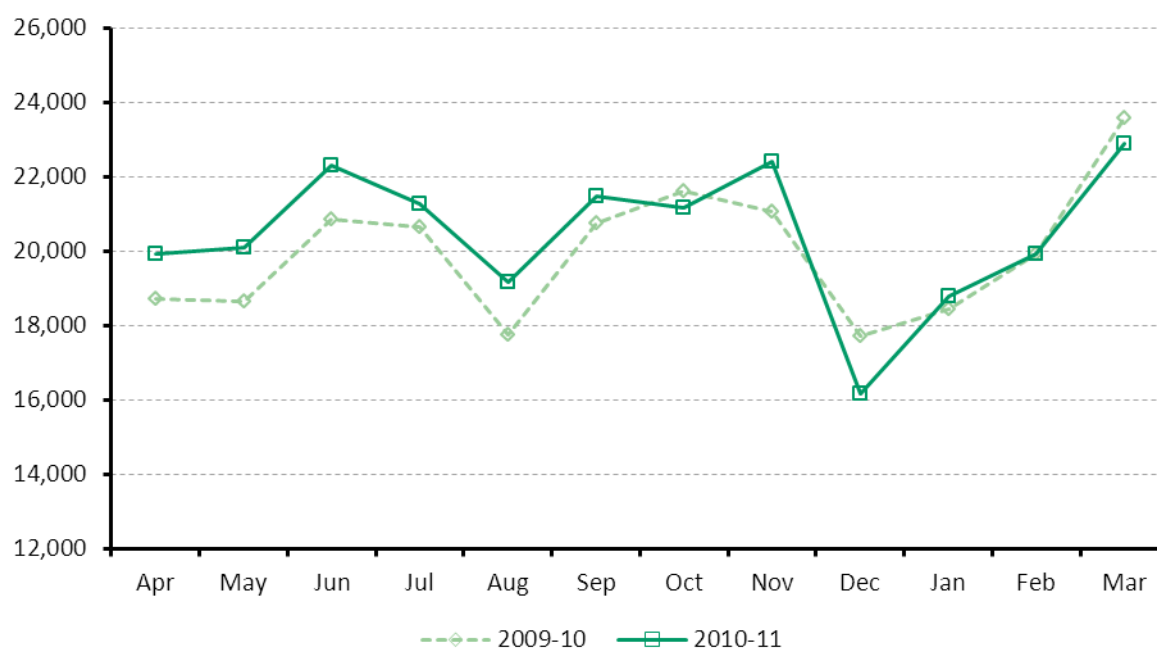


Chart 2: Number of pre-operative questionnaires completed by month in 2009-10 and 2010-11 (Note: vertical axis starts at 6,000)

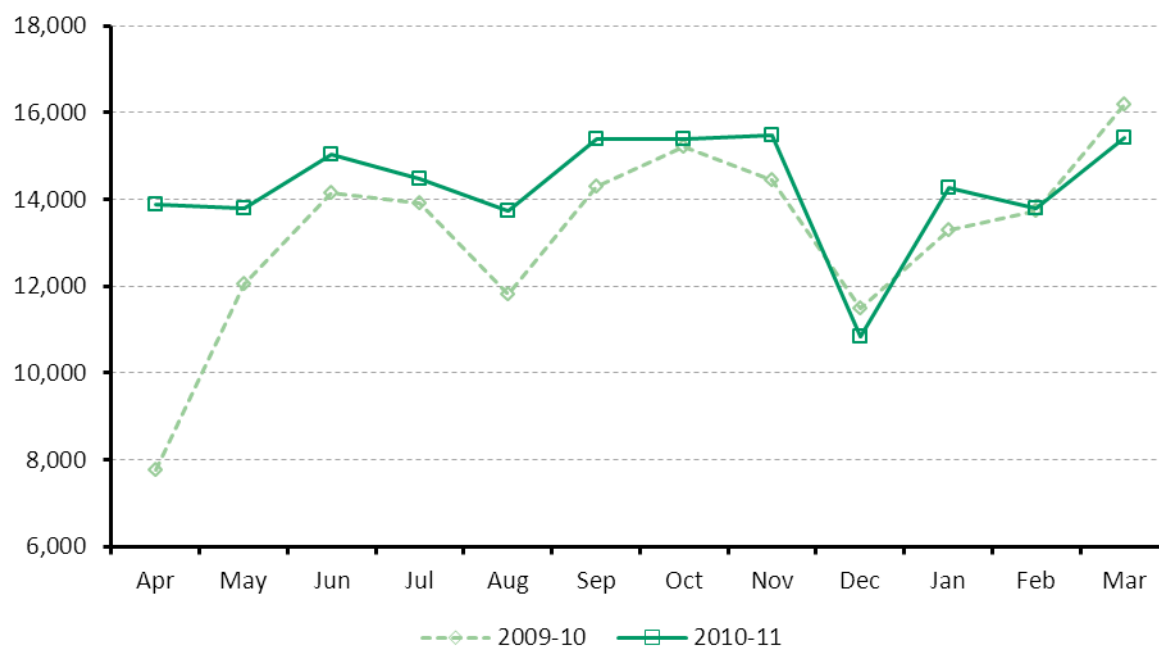


Chart 3: Number of pre-operative questionnaires linked to HES episodes by month in 2009-10 and 2010-11 (Note: vertical axis starts at 5,000)

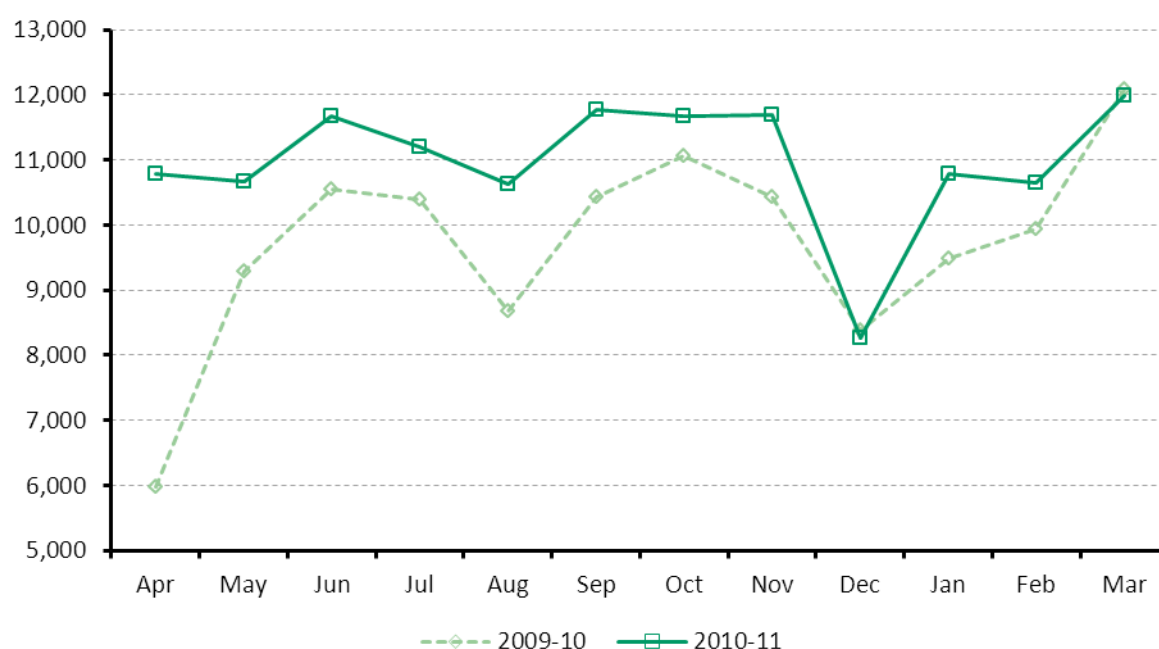


Chart 4: Number of post-operative questionnaires completed by month in 2009-10 and 2010-11
(Note: vertical axis starts at 5,000)

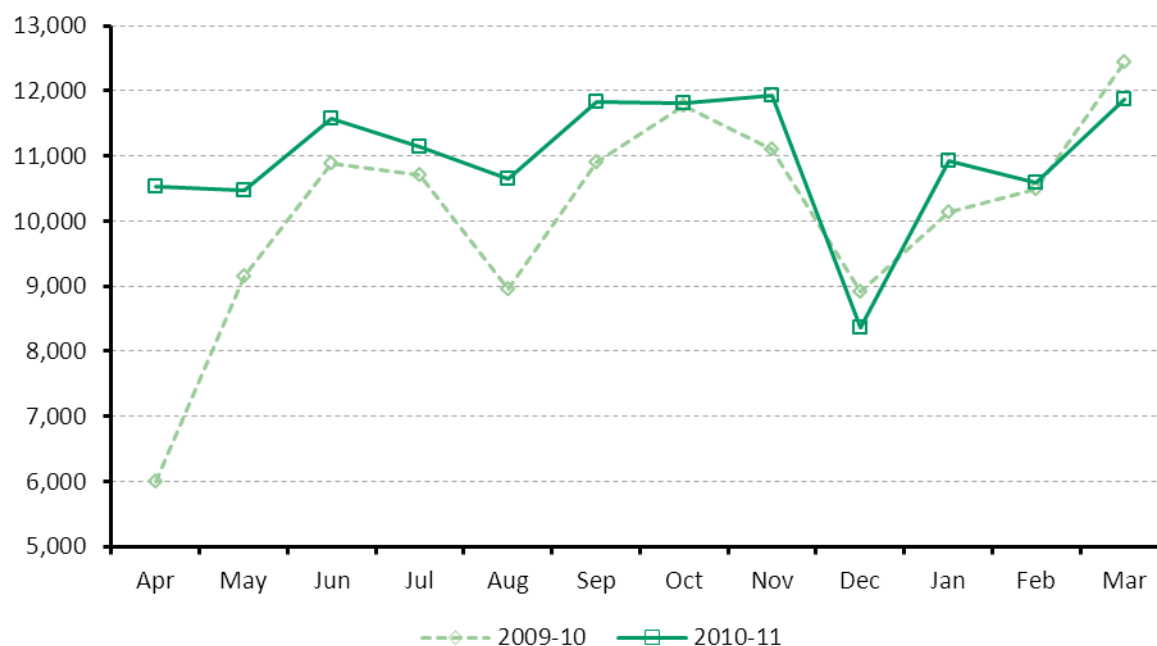
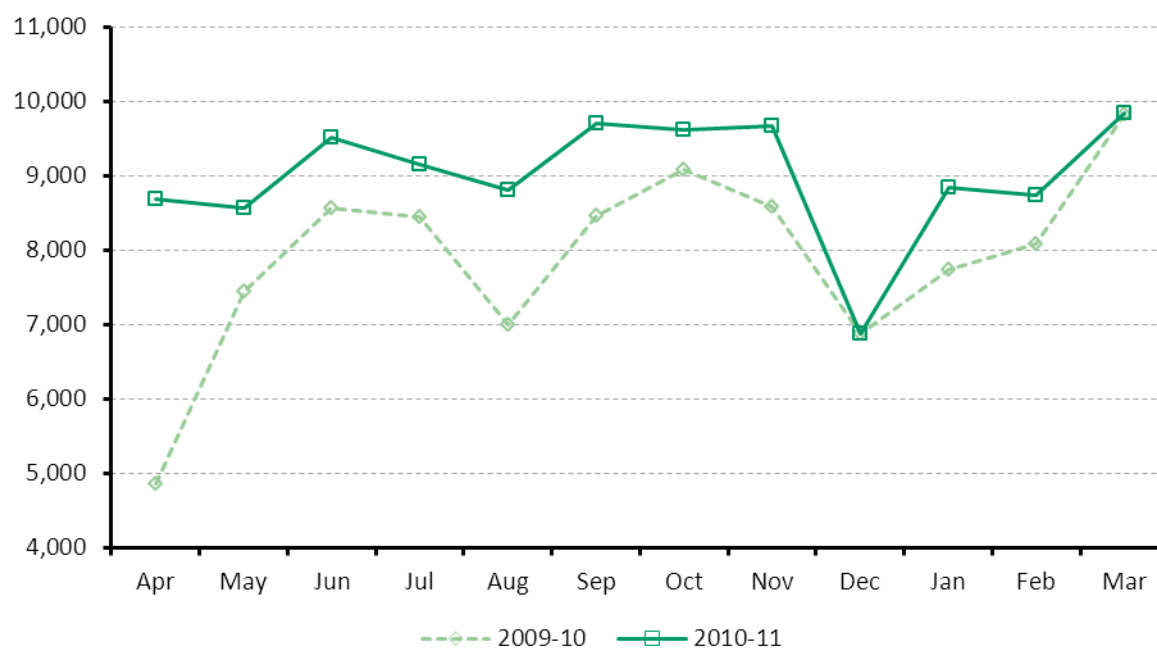


Chart 5: Number of post-operative questionnaires linked to HES episodes by month in 2009-10 and 2010-11 (Note: vertical axis starts at 4,000)

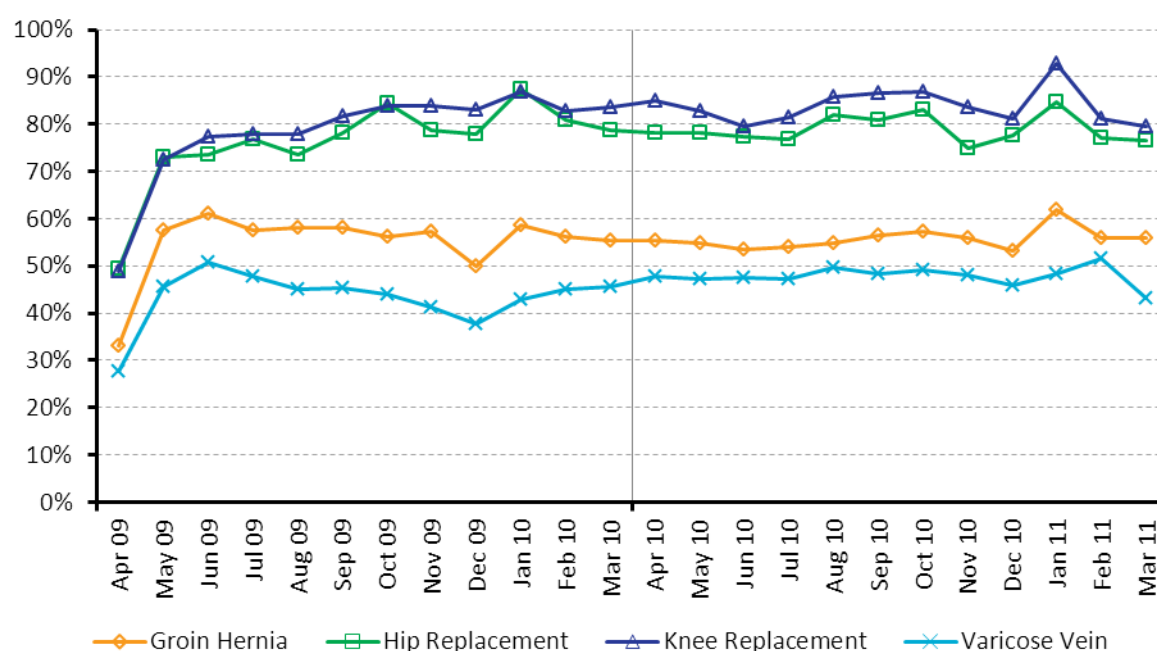


Participation and linkage

The number of pre-operative questionnaires returned compared to the number of eligible HES episodes gives an indication of patients' participation in PROMs. **Chart 6** below shows that the headline participation rate has been generally stable throughout the two full years for which finalised data is available except for the first month of the programme, April 2009.

There is a noticeable peak in headline participation rate, for all but varicose veins, in January 2011. The reason for this is not known but may be associated with the time lag in questionnaire return: the calculated headline participation rate would be augmented by the number of episodes being generally lower in January (see **Chart 1** above).

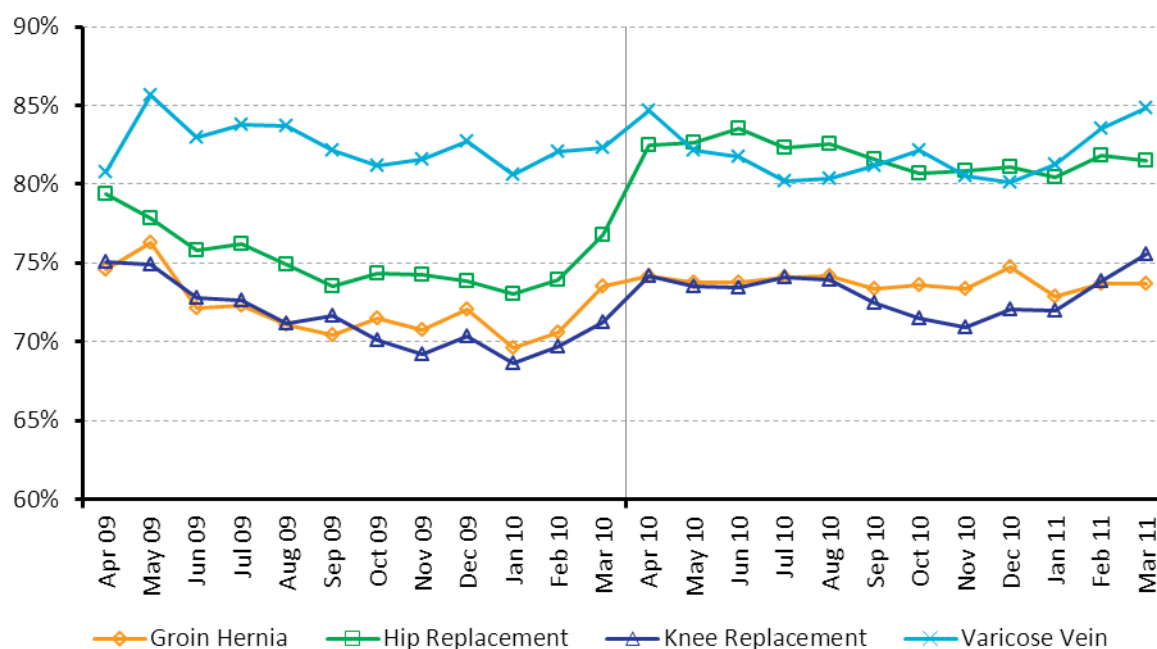
Chart 6: Headline participation rate (pre-operative questionnaires returned in each month⁴ as a fraction of eligible episodes started in that month)



The rate of PROMs questionnaires being successfully linked to HES episodes (**Chart 7**) remained broadly consistent from month to month for all four procedures across both 2009-10 and 2010-11 with the linkage rates for knee replacement and groin hernia surgery being consistently lower than for hip replacement and varicose vein surgery. The rise in linkage rate for hip replacement between 2009-10 and 2010-11 may be at least partially associated with patients who received hip resurfacing, a subset of hip procedures for which some PROMs questionnaires have been issued since the start of the programme (although to do so was not formally in the guidance) but for which HES episodes were not treated as PROMs-eligible in 2009-10 thus effectively depressing the linkage rate in that year.

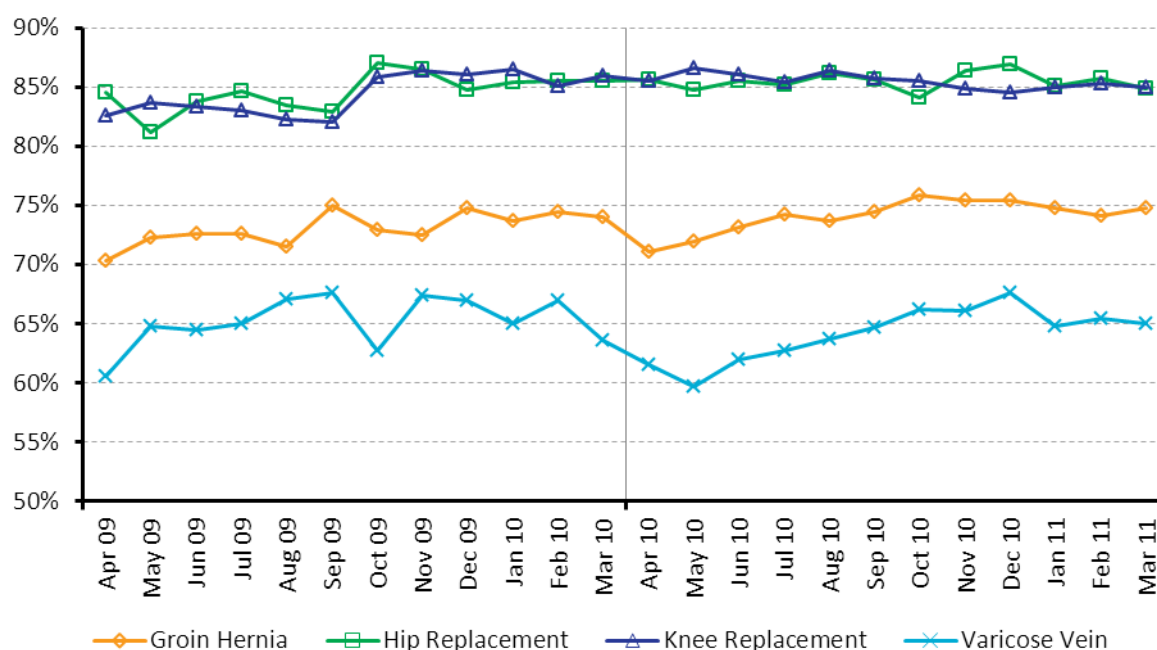
⁴ The month for pre- and post-operative questionnaires and linked questionnaires is the month of the pre-operative questionnaire completion date

Chart 7: Linkage rates (pre-operative questionnaires⁴ linked to an eligible HES episode as a fraction of pre-operative questionnaires) for all four procedures (Note: vertical axis starts at 60%)



For the 171,499 pre-operative questionnaires sent out, there were 162,614 corresponding post-operative questionnaires returned and available for analysis. Reasons for non-return vary but include operations being cancelled and patients choosing not to complete and return their post-operative questionnaires. The post-operative return rates stayed broadly consistent each month over the two years of finalised data (**Chart 8**) but were lower for groin hernia and lower still for varicose vein surgery than for knee and hip replacements; this might in part arise from knee and hip replacements being typically more major and life-changing than groin hernia and varicose vein procedures leading patients to be more willing to complete and return their questionnaires.

Chart 8: Return percentage of post-operative questionnaires⁴ (Note: vertical axis starts at 50%)

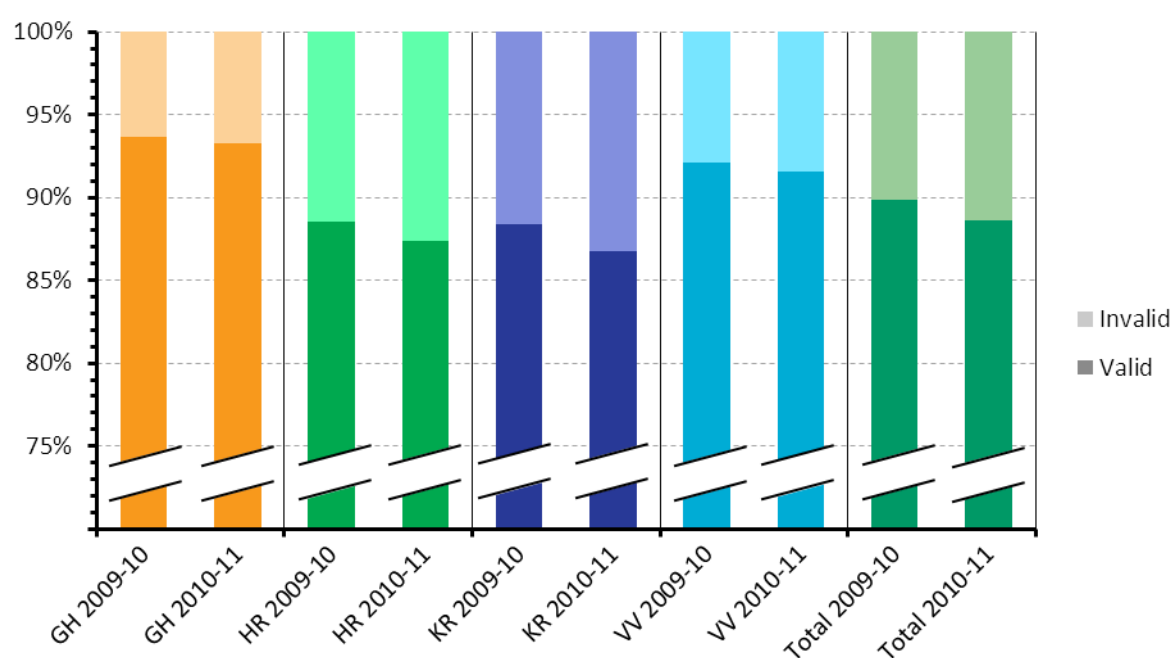


Questionnaire Validity

Most analyses of and comparisons made from PROMs data require both the pre- and post-operative questionnaires to have been returned with valid responses in the appropriate fields. **Table 1** (on page 13) shows how many pre- and post-operative questionnaire pairs for each procedure contained valid or invalid responses. Also shown are the numbers of valid responses for each measure and for each of the additional post-operative questions.

The large majority of questionnaires had valid responses to the questions for all measures (**Chart 9** to **Chart 11**) and this is little changed compared to 2009-10. Valid response rates to the additional questions on only the post-operative questionnaires were similarly high (**Chart 12** on page 14). However, the four questions on complications following surgery (allergy/reaction; urinary problems; bleeding; wound problems) had rates of valid responses which, although high at over 85%, were consistently lower than the four other post-operative-only questions; the reasons for this are not clear.

Chart 9: EQ-5D Index: percentage of questionnaire pairs with valid/invalid responses⁵



⁵ Key: GR = Groin hernia; HR = Hip Replacement; KR = Knee Replacement; VV = Varicose Vein

Chart 10: EQ-VAS: percentage of questionnaire pairs with valid/invalid responses⁵

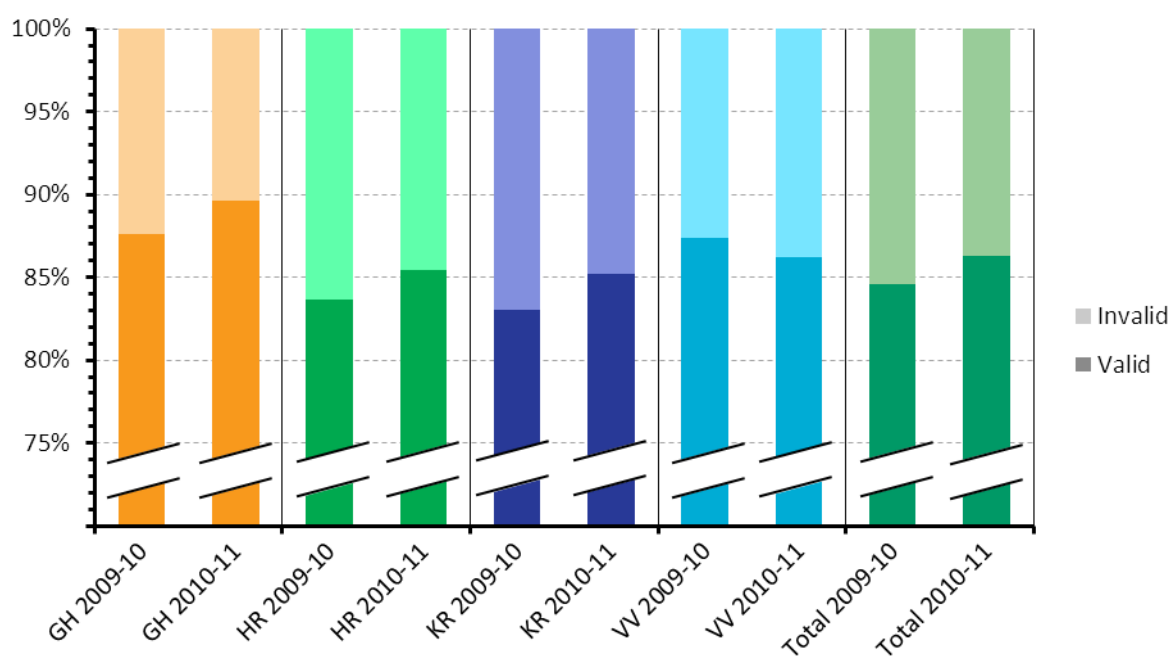
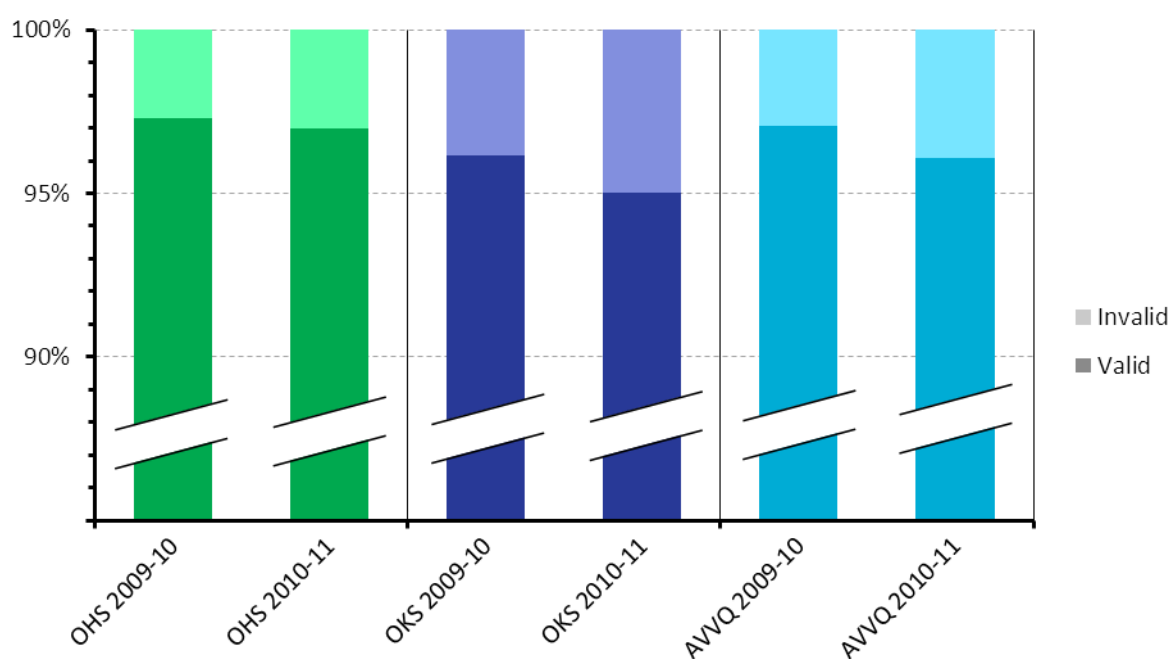


Chart 11: Condition-specific scores: percentage of questionnaire pairs with valid/invalid responses⁶

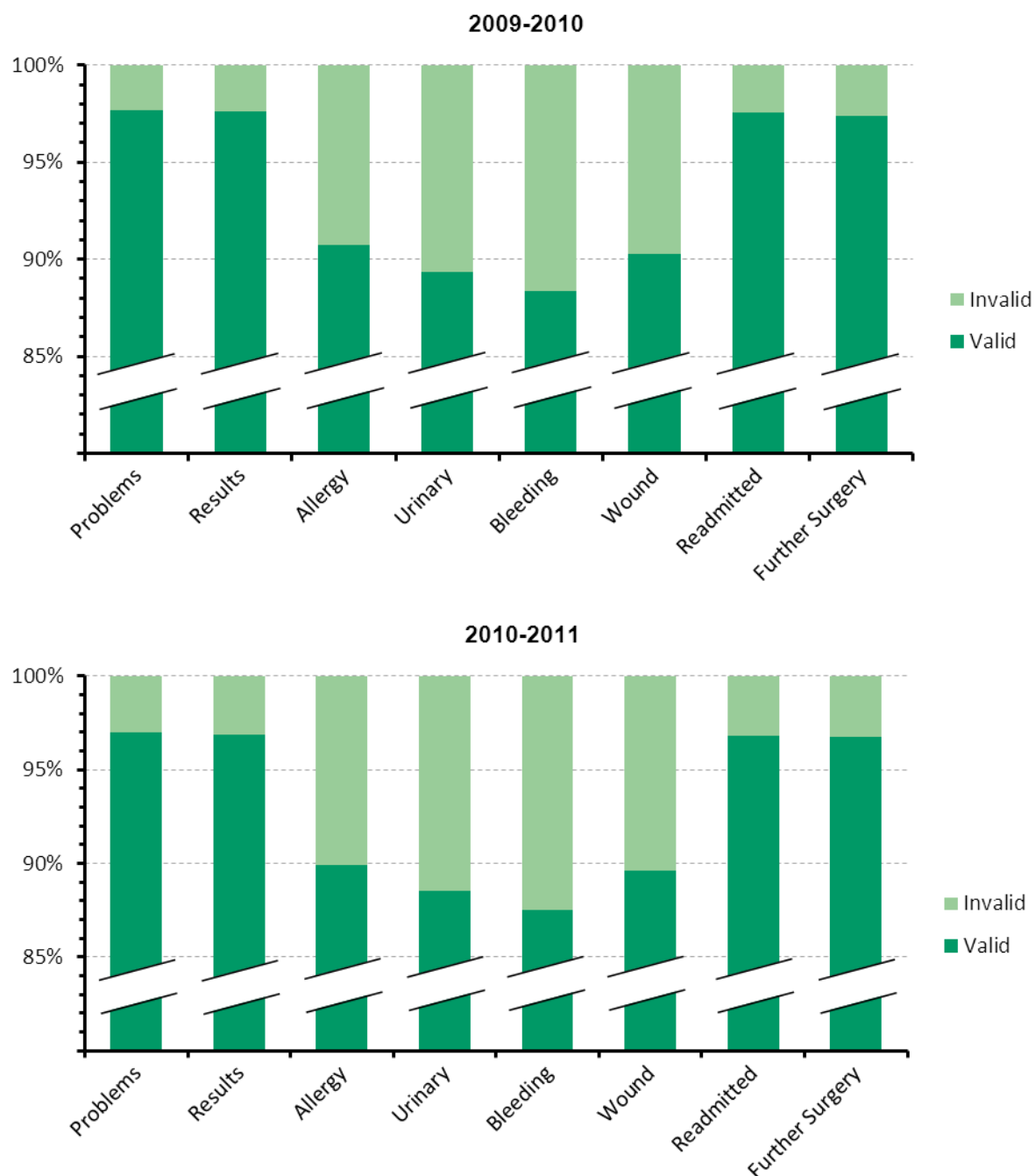


⁶ Key: OHS = Oxford Hip Score; OKS = Oxford Knee Score; AVVQ = Aberdeen Varicose Vein Questionnaire

Table 1: Number of valid and invalid questionnaire pairs by measure, and numbers of valid and invalid responses to the additional post-operative questions (1 April 2010 – 31 March 2011)

	Groin Hernia		Hip Replacement		Knee Replacement		Varicose Vein		Total	
Measure	Valid	Invalid	Valid	Invalid	Valid	Invalid	Valid	Invalid	Valid	Invalid
EQ-5D Index	25,069	1,801	39,038	5,649	44,004	6,715	8,624	796	116,735	14,961
EQ-VAS	24,084	2,786	38,170	6,517	43,217	7,502	8,124	1,296	113,595	18,101
Oxford Hip Score			43,347	1,340					43,347	1,340
Oxford Knee Score					48,185	2,534			48,185	2,534
Aberdeen Varicose Vein Questionnaire							9,049	371	9,049	371
Additional post-operative questions										
Problems compared to before operation	26,024	846	43,390	1,297	49,114	1,605	9,217	203	127,745	3,951
Results of operation	26,047	823	43,326	1,361	48,952	1,767	9,234	186	127,559	4,137
Complications – allergy/reaction	24,319	2,551	40,430	4,257	45,103	5,616	8,589	831	118,441	13,255
Complications – urinary problems	24,370	2,500	39,806	4,881	43,979	6,740	8,466	954	116,621	15,075
Complications – bleeding	24,122	2,748	39,064	5,623	43,444	7,275	8,649	771	115,279	16,417
Complications – wound problems	24,664	2,206	39,837	4,850	44,708	6,011	8,779	641	117,988	13,708
Readmitted to hospital	25,888	982	43,353	1,334	49,044	1,675	9,180	240	127,465	4,231
Further surgery	25,851	1,019	43,367	1,320	49,085	1,634	9,150	270	127,453	4,243

Chart 12: Additional post-operative questionnaire questions: Percentage of valid/invalid response, for all procedures



Results

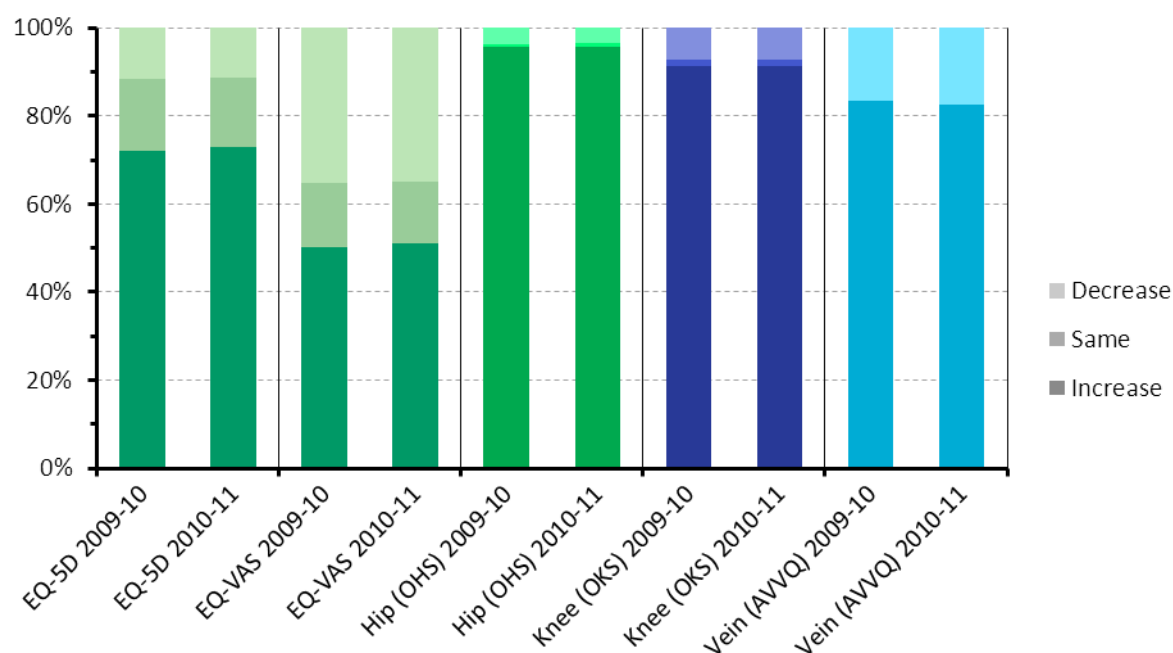
Overall changes in scores

A high-level overview of the changes between pre- and post-operative scores (**Chart 13** below and **Table 2** on page 18) shows little change from 2009-10 in the extent to which questionnaires recorded improvements in patients' health or in their conditions.

For both years, a lower rate of health improvement was recorded for all four procedures on the EQ-VAS than the EQ-5D Index. Some of this difference may be a result of the two mechanisms' differing nature. The EQ-VAS is a simple, easily understood measure based on a patient's self-scored general health on the day that they complete the questionnaire, but provides an indication of their health that is not necessarily associated with the conditions for which they underwent surgery and which may be affected by factors other than healthcare. In contrast, the EQ-5D Index captures condition-specific issues in a broad but clearly-defined way.

Rates of recorded health improvement were higher for the Oxford Hip Score, Oxford Knee Score and Aberdeen Varicose Vein Questionnaire than for either of the generic measures. This is not unexpected given that these condition-specific measures focus on clearly defined aspects of clinical conditions which would be expected to be affected by the procedures.

Chart 13: Percentage of questionnaire pairs with increased, unchanged and decreased health gain recorded⁷



On the general EQ-5D Index score (**Chart 14**), hip and knee replacement respondents recorded markedly higher rates of health improvement (86.7% and 77.9%) than for groin hernia and varicose vein respondents (50.5% and 51.6%). However, many groin hernia and varicose vein respondents (6,814 or 27.2% of groin hernia respondents and 1,941 or 22.5% of varicose vein respondents for whom a score difference could be calculated) recorded a score of 1 — the highest possible score — on the pre-operative questionnaire and so would not be able to show any increase on this measure.

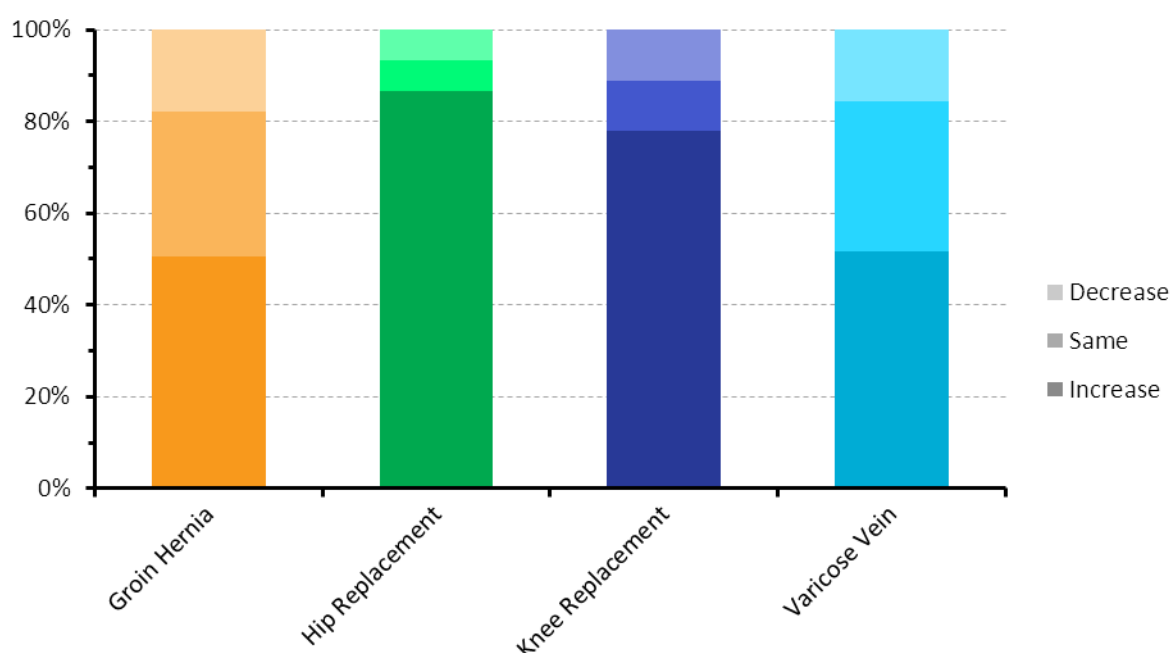
⁷ Percentages of those pre- and post-operative questionnaire pairs for each measure where a score on that measure could be calculated. OHS = Oxford Hip Score; OKS = Oxford Knee Score; AVVQ = Aberdeen Varicose Vein Questionnaire

The percentage of respondents who recorded either an increase or no change in health on this measure was more consistent for each of the four procedures at between 82.1% and 93.3% depending on procedure.

A breakdown of EQ-VAS improvement rates by procedure (**Chart 15**) paints a similar picture, albeit that the rates of improvement are for each procedure lower than for EQ-5D Index, which would be expected given the differing nature of the measures.

Considering the condition-specific measure (**Chart 16**) the recorded rates for patients showing either an improvement or no change was, for all three procedures with a specific measure, higher than measured by either the EQ-5D Index or the EQ-VAS. There were relatively very few questionnaires which showed no change on these condition-specific measures so, for clarity, those which were unchanged have been combined on **Chart 16** with those showing an improvement.

Chart 14: *EQ-5D Index*: percentage of questionnaire pairs with increased, unchanged and decreased health gain recorded⁸



⁸ Percentages of those pre- and post-operative questionnaire pairs for each measure where a score on that measure could be calculated.

Chart 15: EQ-VAS: percentage of questionnaire pairs with increased, unchanged and decreased health gain recorded⁸

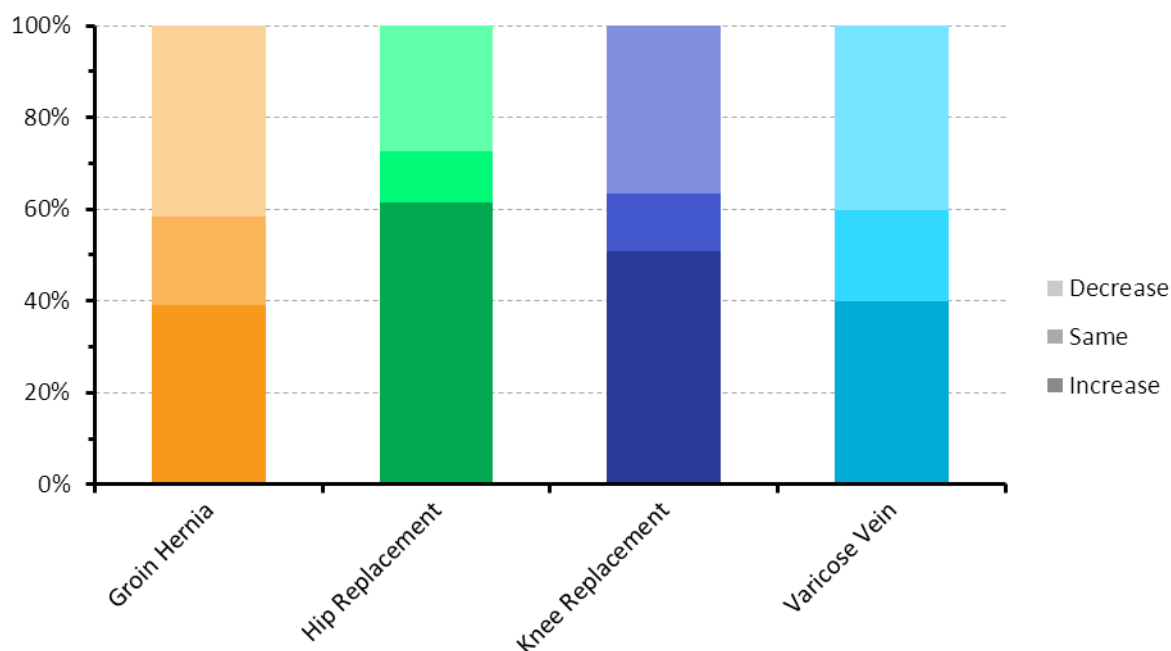


Chart 16: Condition-specific scores (Oxford Hip Score; Oxford Knee Score; Aberdeen Varicose Vein Questionnaire): percentage of questionnaire pairs with increased (or unchanged) and decreased health gain recorded⁸

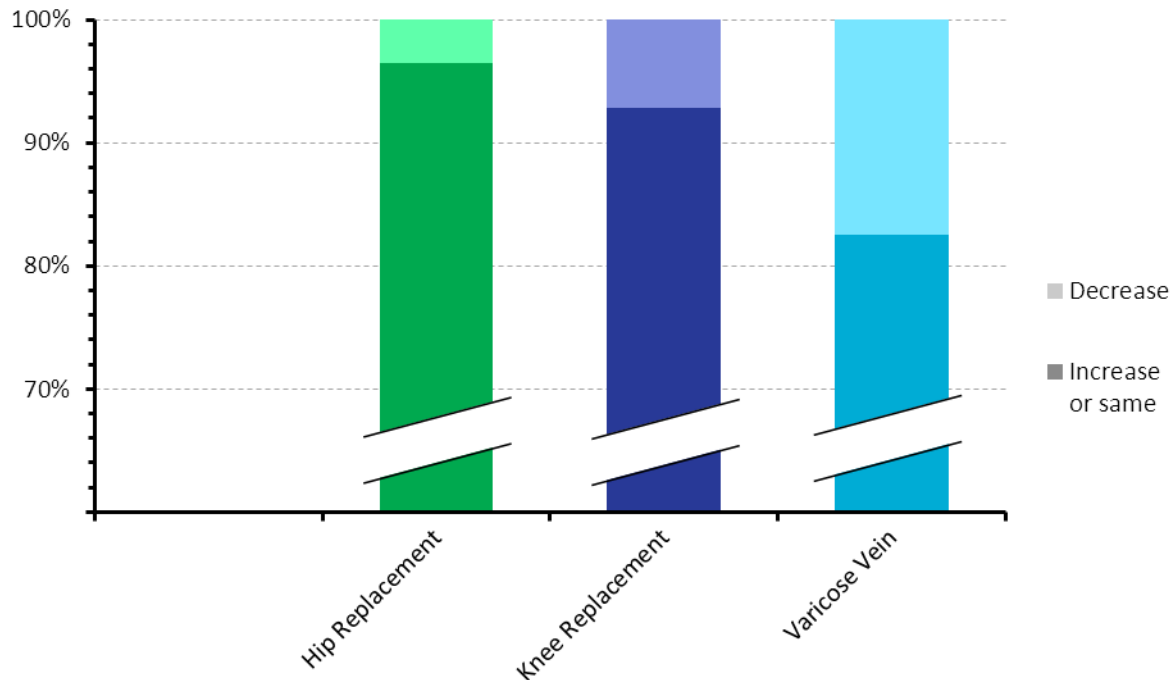


Table 2(a): EQ-5D Index: number and percentage of scores which increased, stayed the same or decreased, by procedure (1 April 2010 – 31 March 2011)⁹

	Groin Hernia	Hip Replacement	Knee Replacement	Varicose Vein	Total
Increase	12,657 (50.5%)	33,841 (86.7%)	34,263 (77.9%)	4,446 (51.6%)	85,207 (73.0%)
Same	7,929 (31.6%)	2,600 (6.7%)	4,856 (11.0%)	2,824 (32.7%)	18,209 (15.6%)
Decrease	4,483 (17.9%)	2,597 (6.7%)	4,885 (11.1%)	1,354 (15.7%)	13,319 (11.4%)
Total	25,069	39,038	44,004	8,624	116,735
Unknown	1,801 (6.7%)	5,649 (12.6%)	6,715 (13.2%)	796 (8.5%)	14,961 (11.4%)
Grand total	26,870	44,687	50,719	9,420	131,696

⁹ All figures in this table are for completed pairs of pre- and post-operative questionnaires. Figures for 'increase', 'same' and 'decrease' are calculated where there are valid scores recorded in both the pre- and post-operative questionnaire; where one or both questionnaires have no valid score recorded, the change has been treated as 'unknown'.

Table 2(b): EQ-VAS: number and percentage of scores which increased, stayed the same or decreased, by procedure (1 April 2010 – 31 March 2011)⁹

	Groin Hernia	Hip Replacement	Knee Replacement	Varicose Vein	Total
Increase	9,412 (39.1%)	23,424 (61.4%)	21,937 (50.8%)	3,235 (39.8%)	58,008 (51.1%)
Same	4,638 (19.3%)	4,274 (11.2%)	5,514 (12.8%)	1,631 (20.1%)	16,057 (14.1%)
Decrease	10,034 (41.7%)	10,472 (27.4%)	15,766 (36.5%)	3,258 (40.1%)	39,530 (34.8%)
Total	24,084	38,170	43,217	8,124	113,595
Unknown	2,786 (10.4%)	6,517 (14.6%)	7,502 (14.8%)	1,296 (13.8%)	18,101 (13.7%)
Grand Total	26,870	44,687	50,719	9,420	131,696

Table 2(c): Condition-specific scores: number and percentage of scores which increased, stayed the same or decreased, by procedure (1 April 2010 – 31 March 2011)⁹

	Groin Hernia	Hip Replacement (Oxford Hip Score)	Knee Replacement (Oxford Knee Score)	Varicose Vein (Aberdeen Varicose Vein Questionnaire)	Total
Increase		41,521 (95.8%)	44,037 (91.4%)	7,464 (82.5%)	93,022 (92.5%)
Same		277 (0.6%)	704 (1.5%)	* *	* *
Decrease		1,549 (3.6%)	3,444 (7.1%)	* *	* *
Total		43,347	48,185	9,049	100,581
Unknown		1,340 (3.0%)	2,534 (5.0%)	371 (3.9%)	4,245 (4.0%)
Grand Total		44,687	50,719	9,420	104,826

* Figures replaced with asterisks have been suppressed to protect patient confidentiality arising from small numbers.

Success and satisfaction of surgery

Patients are asked, on their post-operative questionnaires, to rate the success of their surgical procedure in response to the question, according to their procedure:

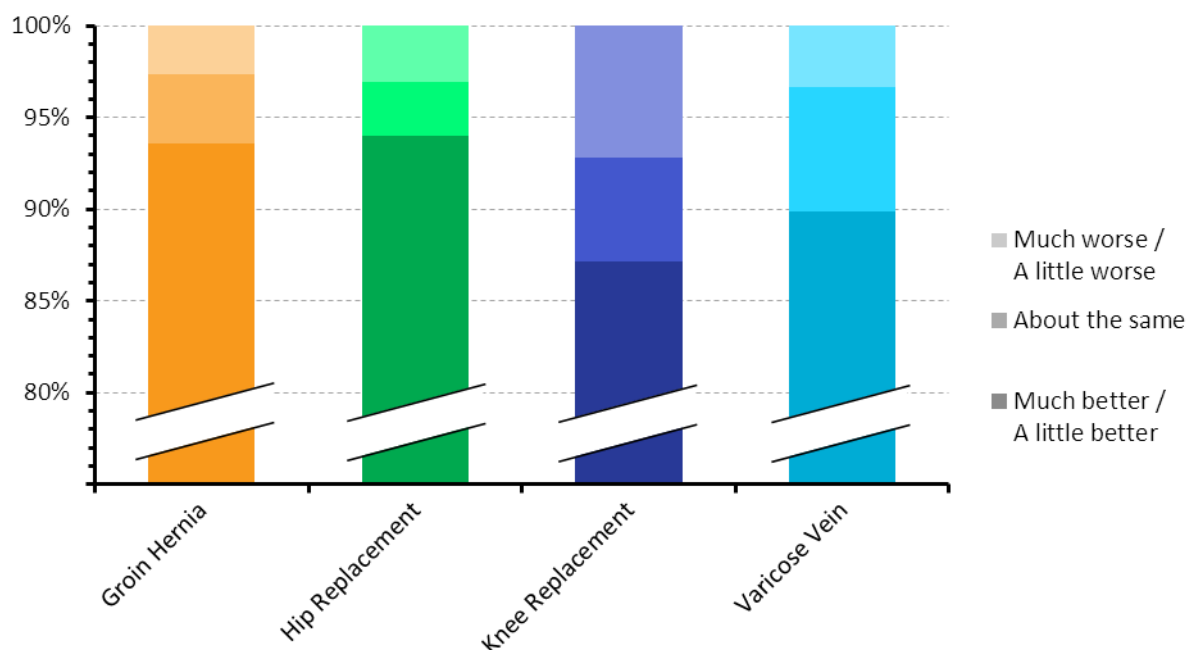
Overall, how are your hernia problems now, compared to before your operation?

Overall, how are the problems now in the hip [or knee] on which you had surgery, compared to before your operation?

Overall, how are the problems now with your varicose veins on which you had surgery, compared to before your operation?

A response to this question was recorded for more than 96% of post-operative questionnaires for each of the four procedures. Positive responses represented a large fraction of the total for each procedure: more than 87% of those who answered in each case.

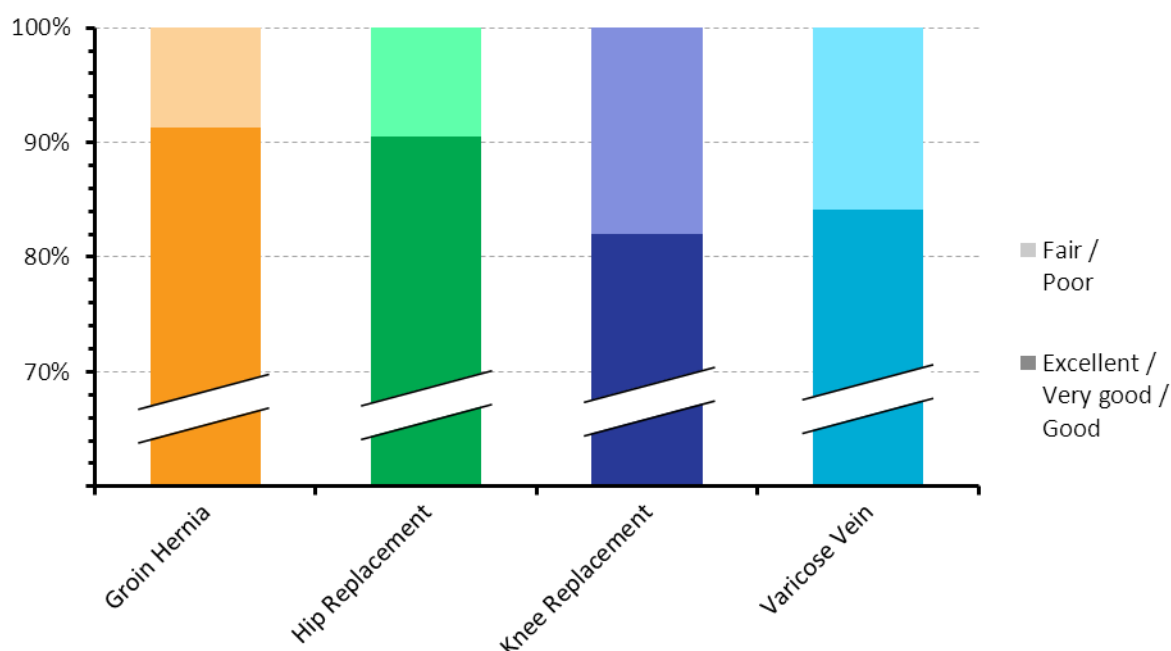
Chart 17: Rates of success¹⁰ reported by patients on post-operative questionnaires, by procedure, 1 April 2010 – 31 March 2011



Patients were also asked to rate their satisfaction with their surgery by describing the results of their operation as 'Excellent', 'Very good', 'Good', 'Fair' or 'Poor'

¹⁰ Percentages of all post-operative questionnaires for each procedure with a valid response to this question

Chart 18: Rates of satisfaction¹⁰ reported by patients on post-operative questionnaires, by procedure, 1 April 2010 – 31 March 2011 (Note: vertical axis starts at 70%)



Knee replacement respondents reported the lowest rates of both success (**Chart 17**) and satisfaction (**Chart 18**), although any underlying reasons for this have not been identified. However, the rates for all four procedures were nevertheless high with at least 87.1% recording 'Much better' or 'A little better' for operative success and between 82.0% and 91.3% describing their satisfaction as 'Excellent', 'Very good' or 'Good'.

Results of both the success and satisfaction questions were very similar to 2009-10: the percentage of respondents indicating 'Much better' or 'A little better' for success differing between the years by less than quarter of a percentage point for each of the four procedures; for satisfaction there was no more than 0.6 percentage points difference between the years for any procedure where the answers were one of 'Excellent', 'Very good' or 'Good'.

Distribution of scores

Context

An **EQ-5D Index** score can range between -0.594 ('worst') and 1 ('best') but it can take only certain values within this range¹¹.

An **EQ-VAS** can be any integer from 0 ('worst') to 100 ('best').

An **Oxford Hip** or **Oxford Knee** score is an integer from 0 ('worst') to 48 ('best').

An **Aberdeen Varicose Vein Questionnaire** value can range between 100 ('worst') and 0 ('best') but it can take only certain values within this range.

Note that for all the scoring mechanisms, it is possible for a large fraction of patients to be covered by a small number of discrete scores.

Distributions

Table 3 (on page 24) shows how the pre- and post-operative scores vary across the range for each scoring mechanism and procedure. Following the table are charts summarising the distributions visually as 'box plots'. Annex 1 on page 29 contains a guide to the interpretation of the box plots.

From **Chart 19** it is clear the extent to which many groin hernia patients and (to a lesser degree) varicose vein patients were already scoring 1 – the highest possible score – pre-operatively on the general EQ-5D Index. This was in fact the case for 6,814 (27.2%) of groin hernia respondents and 1,941 (22.5%) of varicose vein respondents for whom a score difference could be calculated. It was thus impossible for these patients' post-operative score to show any improvement on this measure. All other summary statistics shown on this chart improved between the pre- and post-operative questionnaires, indicating positive health gains for these groups of patients collectively.

Changes on the EQ-VAS (**Chart 20**) were small, even where (particularly for hip and knee replacements) there was an overall positive movement. Comparing with **Table 2(b)**, which shows that 61.4% of hip replacement and 50.8% of knee replacement respondents recorded an increase on the EQ-VAS, **Chart 20** suggests that these increases were generally slight. This measure is, as previously noted, a self-reported measure of general health and so is susceptible to substantial influences beyond the PROMs procedures being reported.

From **Table 2(c)**, it is known that 95.8% of hip replacement and 91.4% of knee replacement respondents recorded an increase in Oxford Hip / Oxford Knee Scores. The distributions (**Chart 21** and **Chart 22**) show that these increases were, for the patient-groups as a whole, substantial; however, the post-operative gaps for both procedures between the 5th percentile and 1st quartile scores and the pulling-down of the mean compared to the median does indicate a long tail of questionnaire-pairs did not score so large an improvement (if any) as the majority. Varicose vein patients (**Chart 23**) recorded generally very slight differences between their pre-operative and post-operative Aberdeen Varicose Vein Questionnaire values: although 82.5% of these patients recorded some increase (**Table 2(c)**), the distributions remained bunched only slightly better as a whole; however, even pre-operatively, it can be seen that a large fraction of these scores were already towards the better end of the scale and so had less room for improvement than for hip and knee patients.

¹¹ For each of the five questions, values corresponding to the responses are multiplied by coefficients then summed across the five questions to create the Index score.

Table 3: Pre- and post-operative mean, median and quartiles for each procedure and scoring mechanism (1 April 2010 – 31 March 2011)								
	Mean		1st Quartile		Median		3rd Quartile	
	Pre-operative	Post-operative	Pre-operative	Post-operative	Pre-operative	Post-operative	Pre-operative	Post-operative
EQ-5D Index								
Groin Hernia	0.788	0.870	0.727	0.796	0.796	1.000	1.000	1.000
Hip Replacement	0.355	0.760	0.055	0.639	0.516	0.796	0.689	1.000
Knee Replacement	0.408	0.704	0.088	0.620	0.587	0.727	0.691	0.883
Varicose Vein	0.761	0.852	0.725	0.796	0.796	1.000	0.848	1.000
EQ-VAS								
Groin Hernia	78.237	78.779	70	70	80	80	90	90
Hip Replacement	65.144	74.503	50	65	70	80	80	90
Knee Replacement	67.588	70.971	53	60	70	75	80	85
Varicose Vein	79.013	78.812	70	70	80	80	90	90
Condition-Specific Scores								
Hip Replacement	18.212	37.885	12	33	18	41	24	46
Knee Replacement	18.997	33.763	13	27	19	36	24	42
Varicose Vein	18.620	11.248	11.663	3.826	16.758	8.937	23.655	16.175

Chart 19: EQ-5D Index: Distribution of scores (5th and 95th percentiles, median, mean and quartiles) for each procedure, for pre-operative and post-operative questionnaires (pre-operative questionnaires returned between 1 April 2010 to 31 March 2011). Minimum and maximum possible scores shown by dashed lines

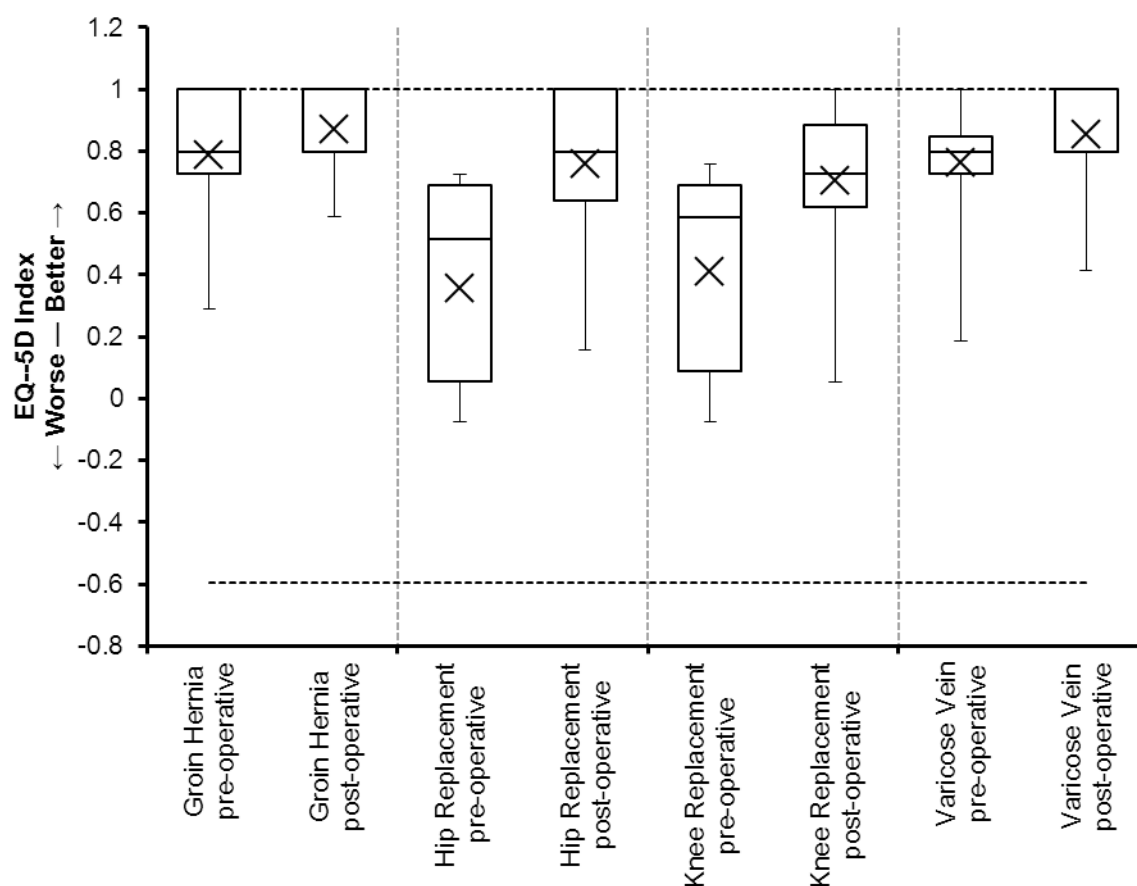


Chart 20: EQ-VAS: Distribution of scores (5th and 95th percentiles, median, mean and quartiles) for each procedure, for pre-operative and post-operative questionnaires (pre-operative questionnaires returned between 1 April 2010 to 31 March 2011). Minimum and maximum possible scores shown by dashed lines

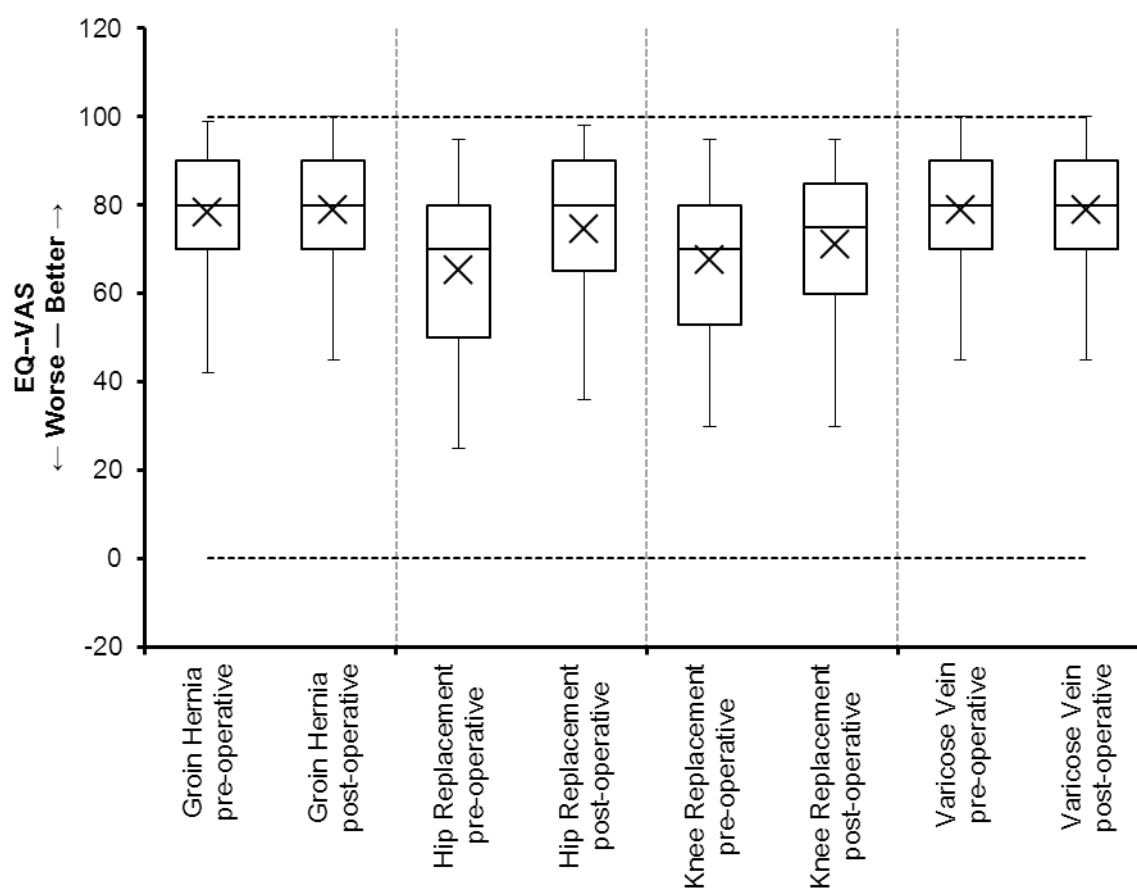


Chart 21: Oxford Hip Score: Distribution of scores (5th and 95th percentiles, median, mean and quartiles) for each procedure, for pre-operative and post-operative questionnaires (pre-operative questionnaires returned between 1 April 2010 and 31 March 2011). Minimum and maximum possible scores shown by dashed lines

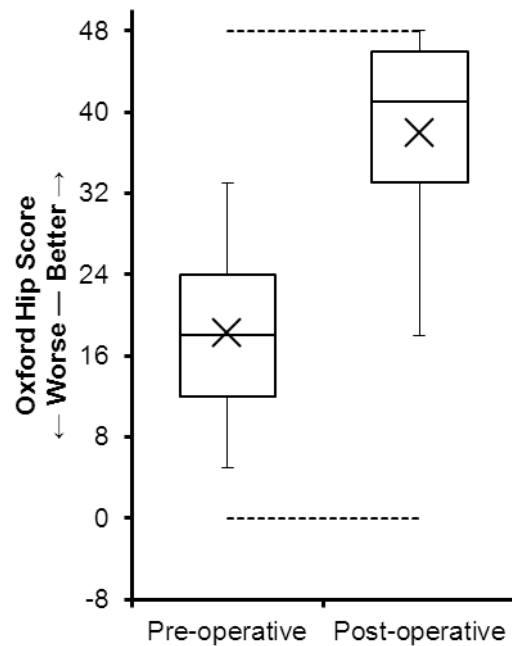


Chart 22: Oxford Knee Score: Distribution of scores (5th and 95th percentiles, median, mean and quartiles) for each procedure, for pre-operative and post-operative questionnaires (pre-operative questionnaires returned between 1 April 2010 and 31 March 2011). Minimum and maximum possible scores shown by dashed lines

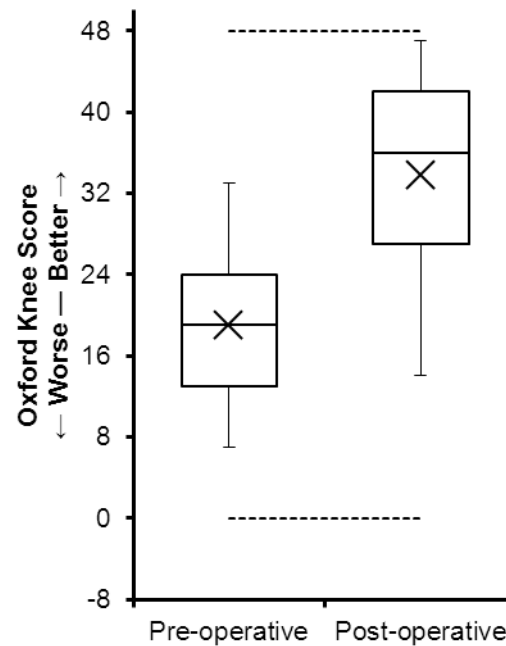
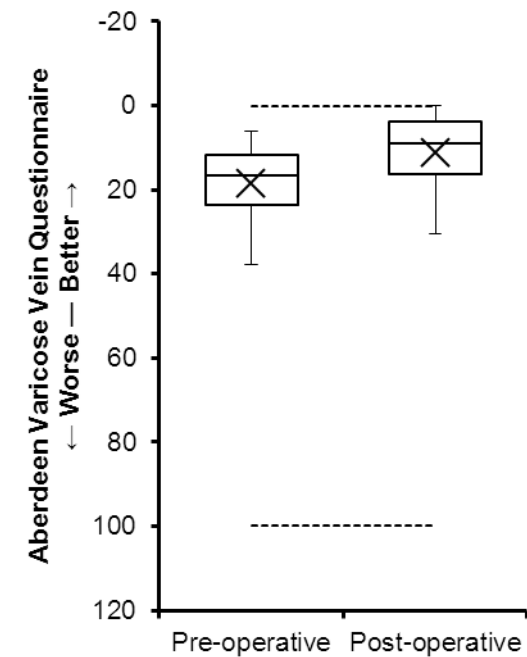


Chart 23: Aberdeen Varicose Vein Questionnaire: Distribution of scores (5th and 95th percentiles, median, mean and quartiles) for each procedure, for pre-operative and post-operative questionnaires (pre-operative questionnaires returned between 1 April 2010 and 31 March 2011). Minimum and maximum possible scores shown by dashed lines



Organisation-level analysis

Outliers

The health gains recorded for each provider of PROMs-procedure surgery have been compared to a national average, using a statistical model to take account of the differing case-mix seen by each provider. The model identifies as 'outliers' those providers which have outcomes significantly different from the national average – a 'positive outlier' has a significantly better outcome than expected; a 'negative outlier' significantly worse. The outlier model is based on statistical theory and is not a declaration of the provider doing anything 'wrong' or 'right'; in particular there is a roughly 1 in 500 chance that a provider would be identified by the model as an outlier merely because of random variation in their patients.

Organisations with a questionnaire count of fewer than 30 are excluded from outlier analysis. No adjusted results have been calculated for these providers as the underlying statistical methods break down when counts are low; furthermore, aggregate calculations based on small denominations may return unrepresentative results.

In the finalised 2010-11 dataset there were 56 providers identified as outliers – 21 positive and 35 negative – for specific measures, compared to 41 providers in the 2009-10 dataset – 19 positive and 22 negative (**Table 4** below).

Table 4: Number of positive and negative outlier organisations, by procedure and measure, for 2009-10 and 2010-11

	2009-10				2010-11			
	EQ-5D Index		Condition-specific Score		EQ-5D Index		Condition-specific Score	
	+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Groin Hernia	0	0			0	1		
Hip Replacement	3	0	5	9	5	9	6	8
Knee Replacement	2	3	9	4	1	6	9	10
Varicose Vein	0	2	0	4	0	0	0	1
Total	5	5	14	17	6	16	15	19

A full list of outliers can be accessed through the *Score Comparison Spreadsheet* [published alongside this report](#).

[<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1582>]

Adjusted health gain

Adjusted average health gain scores have been calculated for each provider organisation based on models developed by contractors¹² on behalf of the Department of Health, taking into account the fact that organisations deal with patients with a differing case-mix. These scores can be seen in the accompanying *Score Comparison Spreadsheet*, compared against the national average.

Further information regarding the methodology can be found at the [CHKS](#)

[<http://www.chks.co.uk/index.php?id=24>]

and [Northgate PROMs](#)

[<http://www.northgate-proms.co.uk/documents.html>] websites.

Feedback and comments on the methodology are welcome and may be sent to: enquiries@ic.nhs.uk.

¹² CHKS Ltd in conjunction with Northgate Information Solutions Ltd.

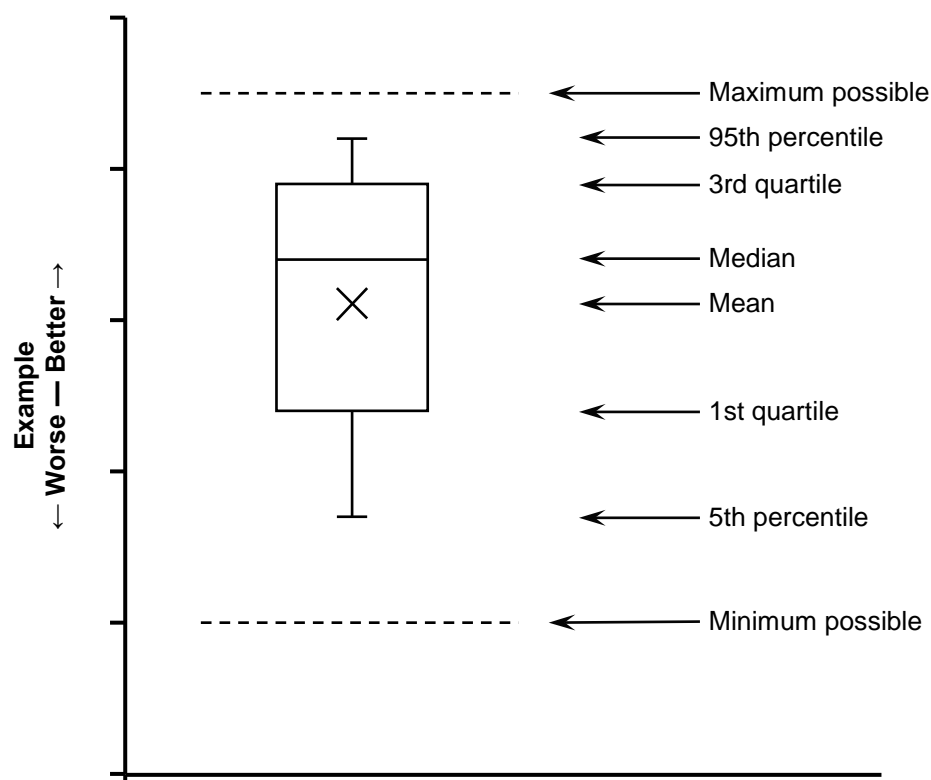
Annex 1 – Interpreting box plots

It can be useful to compare average health scores between categories of patients can be useful or between pre- and post-operative responses. But the average can be a crude summary of a more complex picture. For instance, a group of patients could mostly report a modest health gain following a procedure whilst another group reports wildly disparate gains across the spectrum from greatly decreased health to greatly increased; yet the average health gain for both groups of patients could conceivably be the same. It is therefore useful to be able to give a more complete summary of how the patients' scores or health gains are distributed.

The box plots presented in the 'Distribution of scores' section (starting on page 23) show several aspects of the scores which together paint a picture of how scores are distributed across the group of patients.

The example diagram below shows how the box plots indicate the following information¹³:

- minimum and maximum possible values
- 5th and 95th percentiles – a broad indication of the range of scores: 90% of scores fall between these values
- 1st and 3rd quartiles – a more tight indication of the range of scores: half the scores fall between these values
- median – indicating the middle-of-the-road, splitting the set of scores into two, half above and half below this value
- mean – the 'average' score, the position of which relative to the median can sometimes reveal telling information about the existence and/or extent of extreme values.



¹³ Definitions of the median, quartiles and percentiles have been simplified slightly for clarity

The Health and Social Care Information Centre welcomes all feedback on this publication.

Feedback can be provided by going to the [Contact us](#) section of HESonline.

[<http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=377>]

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