National Cardiac Audit Programme (NCAP)

NACSA Annual Report 2023 (Data for the 3 years - from April 2019 to March 2022) Appendix – additional data (including all data from which main report derived)

Contents

Introduction

This is the third year of producing an Appendix to the NACSA Annual Report. It allows a far greater scope to publish a wealth of data than could possibly be contained within the main report. In particular it allows a breakdown of many of the performance metrics at hospital level, whilst also giving far more detail at a national level.

It contains information on the trends of most of the common cardiac operations performed. It also contains for the first time a detailed breakdown of the various types of minimally invasive cardiac surgical operations being undertaken in the UK.

Outcomes, and in particular for mortality, are very good following cardiac surgery in the UK. Mortality rates are low for all the common non-emergency operations. Again, this year, all hospitals in the UK were performing as expected with regards to mortality rates over this latest three-year analysis period. No hospital has performed at a level that is worse than expected either for all cardiac operations combined, or for isolated coronary artery surgery. These analyses are for England, Wales and Northern Ireland. Unfortunately, as for last year, Scotland has chosen to not take part.

We are truly indebted to the audit leads and their teams in each of the hospitals that collect and upload this data to NICOR. Many units started to upload data in near real time during the COVID-19 pandemic and have continued to do so. This has allowed us to closely monitor the dramatic effects of the pandemic that have been seen. It has also benefited hospitals using the online tools within the NACSA portal, as it allows them to continuously monitor and compare their own performance for many of the important quality indicator (QI) metrics against all the other UK hospitals, rather than waiting for annual reports such as this. This ability for hospitals to regularly benchmark performance is very much part of the drive from SCTS and NICOR towards a quality agenda that does not just focus on mortality rates.

I would like to say a huge thank you to all those of you that contributed to the report and I hope readers find this additional data helpful.

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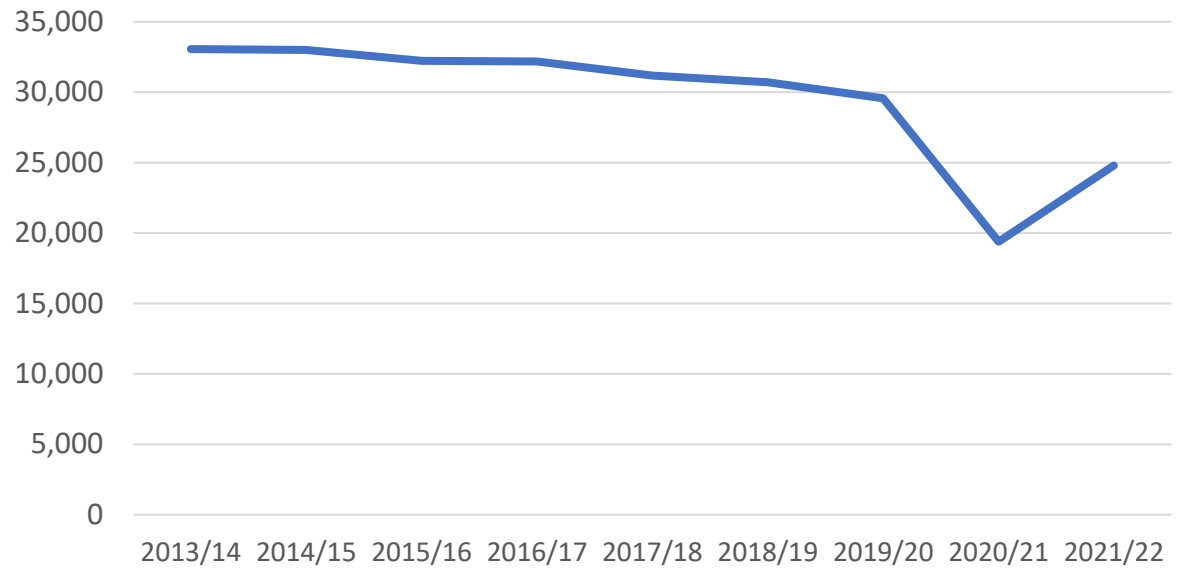
Executive summary of findings of 2023 NACSA report

Focus of attention		Audit finding
Cardiac surgical services have been dramatically impacted by the pandemic	➔	Overall, about 10,000 heart operations were not performed in the first year of the pandemic. In 2021/22, nearly 5,000 fewer operations were performed than would be expected.
Fewer CABG operations were performed	➔	Almost 2,000 fewer CABG procedures were performed compared to pre-pandemic (a 14.9% reduction).
There were fewer surgical aortic valve procedures but more TAVIs	➔	Treatment levels for patients with aortic valve disease have nearly returned to pre-pandemic levels. Twice as many are now being treated with TAVI compared to conventional aortic valve (AVR) surgery.
More patients should be discussed at a Multi-Disciplinary Team (MDT) meeting	➔	A pre-operative MDT discussion was documented for only 32% CABG, 32% AVR and 37% Mitral operations last year.
Overall unadjusted cardiac surgical mortality rose slightly during the pandemic, as surgical practice moved towards doing proportionately more urgent and emergency cases	➔	In the first year of COVID-19, the crude mortality rate following heart surgery (all types combined, including emergencies) increased to 3.3%, having been falling over the past two decades to just over 2.5% in 2019/20. The mortality rate improved to 2.9% in 2021/22 but was still higher than prior to the pandemic.
Surgical mortality after elective CABG remained low	➔	The risk of dying was 0.4% after elective CABG and just under 1.2% after urgent CABG.
Mortality rates after most aortic valve operations are low	➔	Overall mortality rates were 1.8% after isolated AVR and 2.4% after combined AVR & CABG. For low-risk patients (EuroSCORE 2 predicted <4%) for isolated AVR (which comprises 95% of operations), mortality averaged 0.8% over the last three-year period.
There were fewer mitral valve repair operations and very considerable variation in rates between hospitals	➔	The rate of mitral valve repair was only 60% across the UK. The best performing hospital achieved over 86% and the worst recorded just under 26%.

More emergency aortic operations performed	➔	Emergency operations on the thoracic aorta increased from 382 cases in 2013/14 to 644 cases in 2021/22 (a 68% increase). The mortality rate was 17% last year.
Cardiac surgeon workloads did not recover to pre-pandemic levels	➔	In 2013, consultant surgeons performed 140 operations per year on average. This dropped dramatically to only 76 cases in the first year of the pandemic before recovering to 94 cases in 2021/22.
Efforts to reduce waiting times for both elective and urgent CABG are required	➔	Elective CABG waiting times are 11.7% longer than pre-pandemic with only 9 NHS hospitals achieving the 12-week target. Urgent CABG waiting times are 2 days longer than pre-pandemic with no hospital achieving the 7-day target.
Surgical trainee opportunities have been reduced by lower numbers of operations	➔	Surgeons in training performed almost 5,100 cases in 2021/22 (23% of cases in England). This is an equivalent proportion to previous years. However, fewer operations were done, so this represents a reduction in training opportunity.
Overall, low re-operation rates for bleeding after isolated CABG but considerable inter-hospital variability in both this and transfusion rates	➔	Last year 2.2% patients were reopened for bleeding following CABG surgery, with rates between centres varying from 0.5% to 7% Around 46% of patients undergoing CABG required a blood transfusion. Again, there was significant variation between centres (from less than 10% to 100%).

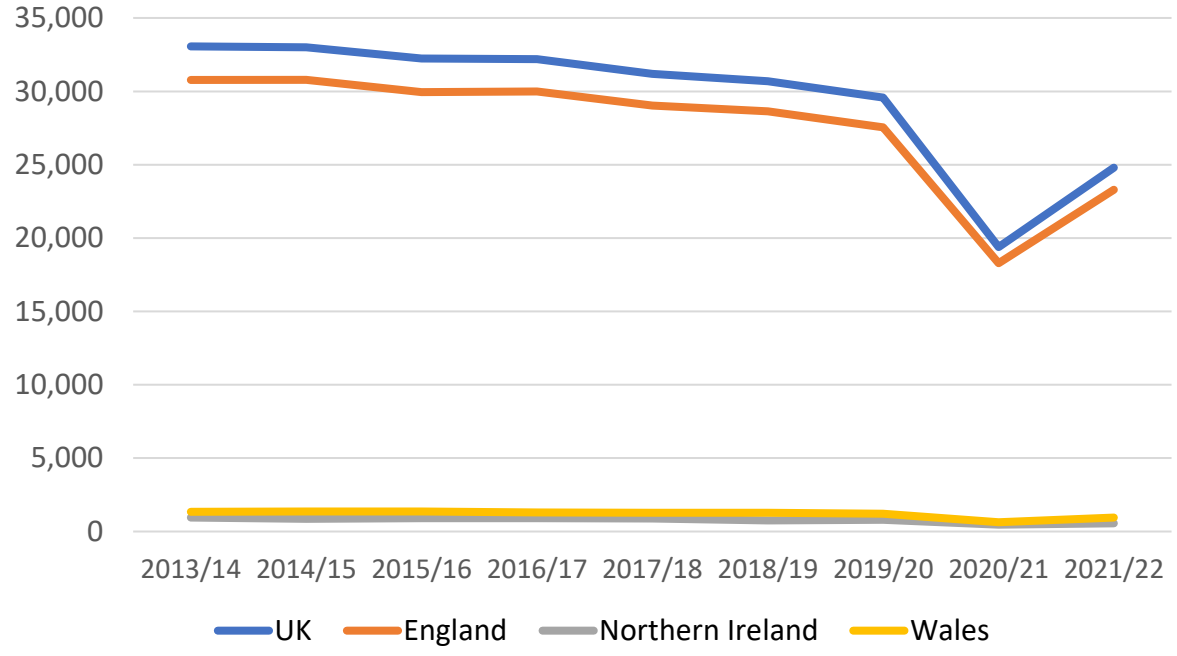
General Trends and Outcomes

Annual Case Numbers – All Procedures (including emergencies) for UK (excluding Scotland)



Nation	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK	33062	33011	32231	32195	31179	30698	29573	19385	24807
England	30769	30782	29949	29991	29032	28647	27548	18287	23294
Northern Ireland	951	864	917	907	878	762	803	465	569
Wales	1342	1365	1365	1297	1269	1289	1222	633	944

Annual Case Numbers – All Procedures (including emergencies) by UK region

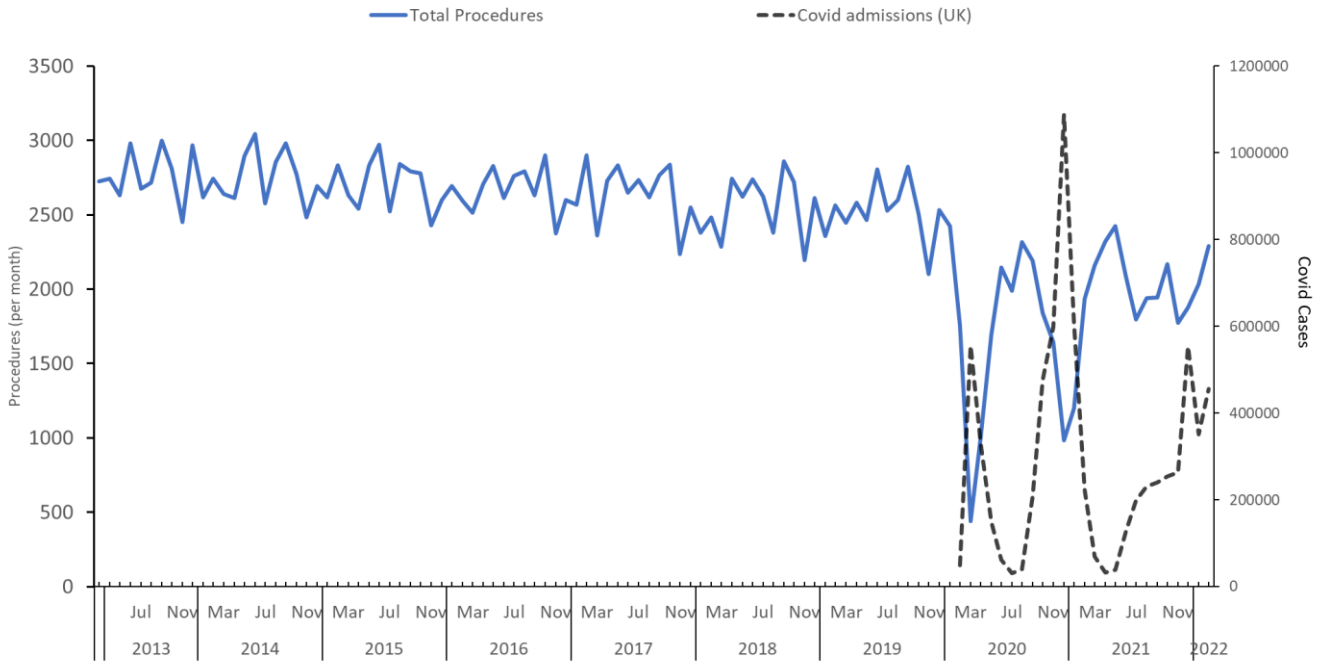


Reductions in Cases Numbers (All Procedures) during the Covid era (UK and nations)

Nation	2019/20	2020/21	2021/22	Cases % 2020/21 vs 2019/20 (First Covid year)	Cases % 2021/22 vs 2019/20 (Second Covid year)
UK	29573	19385	24807	65.5%	83.9%
England	27548	18287	23294	66.4%	84.6%
Northern Ireland	803	465	569	57.9%	70.9%
Wales	1222	633	944	51.8%	77.3%

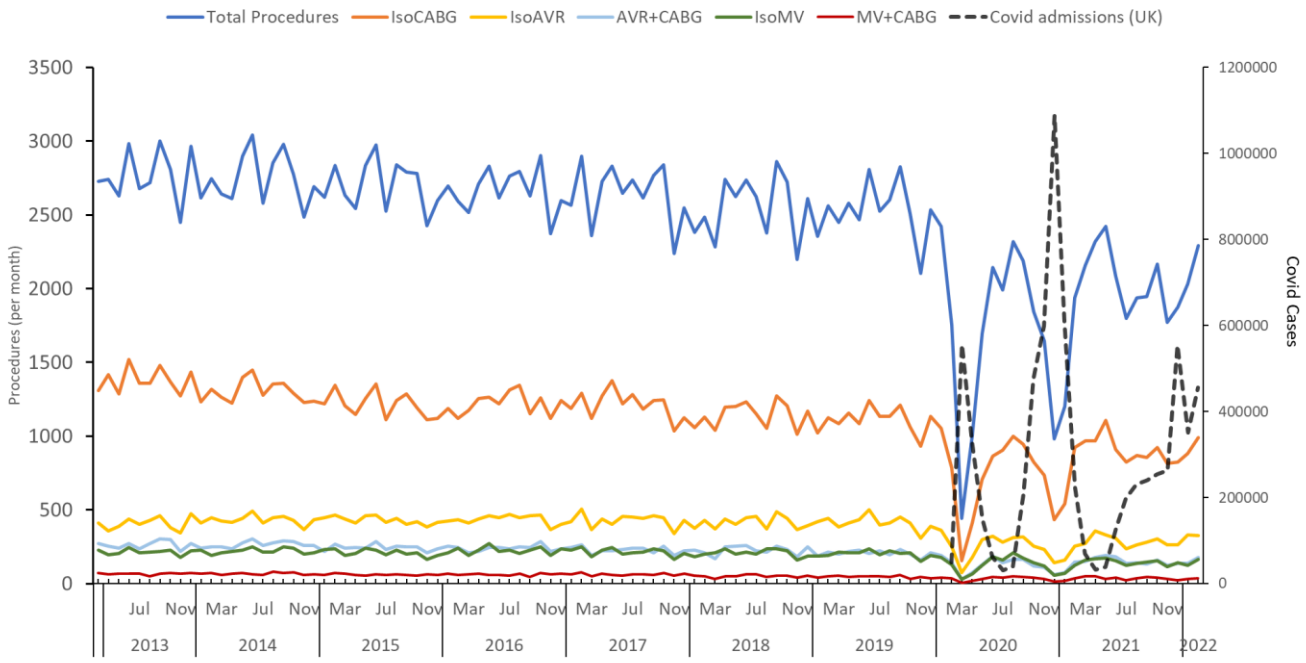
Operation numbers have been falling in the UK for several years prior to COVID-19. It is difficult to get an exact estimate of the reductions that have been seen purely due to the pandemic during the past two years. We have used the data for 2019/20 as the comparator, however, it should be noted that the pandemic started in UK during the end of that financial year and that the UK went into lockdown due to COVID-19 on 26th March 2020. (Data analysed within this report is based on UK financial years of 1st April – 31st March). Analysis in last year's report suggests there are only small differences between estimates using 2018/19 or 2019/20 data as the baseline comparator.

Trends in monthly cardiac operation rates since 2013 vs Covid hospital admissions rates (UK excluding Scotland)



Covid cases shown is daily count of patients with Covid in hospital per month (cumulative) in UK – (i.e. equivalent to monthly count of NHS beds occupied with Covid patients).

Trends (monthly) in cardiac surgical activity by procedure type – since 2013 – UK (excluding Scotland)



IsoCABG isolated CABG; IsoAVR isolated AVR; AVR+CABG (with no concomitant procedures); Iso MV isolated mitral procedure (repair or replacement); MV+CABG (with no concomitant procedures)

Case Numbers – All Procedures (including emergencies) – per year/Unit level

Hospital	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22
Spire St Anthony's Hospital (PP)	262	350	258	108	98	87	59	13	56
Barts and the London	1028	940	1654	1837	1933	2124	2001	1461	1729
Basildon Hospital	922	911	909	890	750	819	714	507	697
Liverpool Heart and Chest Hospital	1922	1935	1908	2067	2040	1891	1765	1134	1625
Bristol Royal Infirmary	1488	1407	1315	1308	1257	1331	1186	926	1055
Spire Southampton Hospital (PP)	574	449	403	407	401	336	612	216	364
Castle Hill Hospital	702	655	660	696	627	788	837	423	561
Nottingham City Hospital	666	572	550	535	603	611	548	471	502
Cromwell Hospital (PP)	15	0	2	33	21	33	15	23	NA
Freeman Hospital	725	737	743	735	712	703	611	551	511
St George's Hospital	907	843	898	1102	1005	717	670	346	517
Glenfield Hospital	1104	1177	1091	1115	1068	1051	974	554	776
Hammersmith Hospital	767	619	626	591	600	620	619	327	451
Harefield Hospital	1000	971	943	929	940	954	1038	939	925
Wellington Hospital North (PP)	219	218	141	124	92	NA	NA	NA	NA
Harley Street Clinic (PP)	119	134	109	133	119	NA	NA	NA	NA
King's College Hospital	787	987	869	888	820	760	798	423	690
London Bridge Hospital (PP)	205	155	147	163	89	NA	NA	NA	NA
Leeds General Infirmary	995	975	1036	869	918	916	866	534	644
Morriston Hospital	603	697	613	607	657	654	572	270	438
Manchester Royal Infirmary	715	772	648	742	785	715	679	363	401
New Cross Hospital	913	850	810	851	778	869	848	543	832
Northern General Hospital	888	928	1014	928	918	908	884	530	624
Royal Brompton Hospital	671	855	831	882	849	870	849	635	977
Papworth Hospital	1892	2104	2043	1957	1821	1798	1644	1170	1447
Derriford Hospital	1116	1058	1121	1104	1010	968	1058	844	878
Queen Elizabeth Hospital	468	586	563	611	648	667	611	322	261
John Radcliffe Hospital	883	860	828	774	833	824	691	485	695
Royal Sussex County Hospital	608	520	603	659	605	637	593	335	477
Royal Victoria Hospital	951	864	917	907	878	762	803	465	569
James Cook University Hospital	1052	1052	1052	1031	975	949	886	650	791
Southampton General Hospital	1251	1333	1316	1307	1324	1281	1180	773	947
St Thomas' Hospital	1053	1076	1010	1065	958	1067	1138	580	833

University Hospital of North Staffordshire	854	853	875	871	754	732	672	416	517
University College Hospital	932	911	38	0	0	0	0	0	0
University Hospital of Wales	739	668	752	690	612	635	650	363	506
Blackpool Victoria Hospital	1281	1165	1109	977	1080	1066	1019	805	1026
University Hospital Coventry	783	795	772	677	657	637	609	326	492
Wythenshawe Hospital	1002	1023	1054	1025	944	918	874	662	983

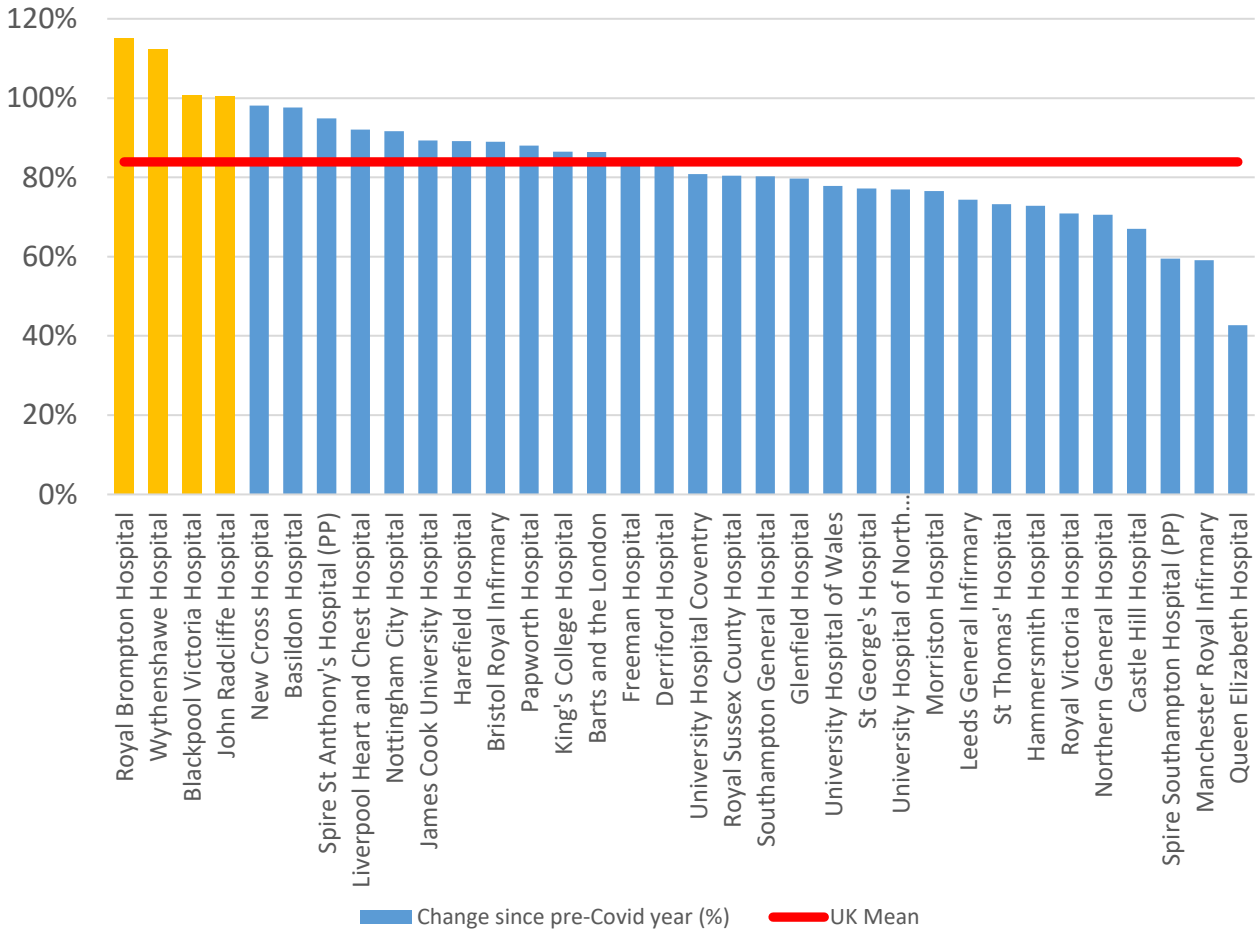
PP Private Hospital.

Reduction in Case Numbers in 2021/22 compared to pre-Covid year (2019/20) – Unit level

Hospital	Cases 2019/20	Cases 2021/22	Cases compared to pre COVID (% 2021/22 vs 2019/20)
Royal Brompton Hospital	849	977	115.1%
Wythenshawe Hospital	874	983	112.5%
Blackpool Victoria Hospital	1019	1026	100.7%
John Radcliffe Hospital	691	695	100.6%
New Cross Hospital	848	832	98.1%
Basildon Hospital	714	697	97.6%
Spire St Anthony's Hospital (PP)	59	56	94.9%
Liverpool Heart and Chest Hospital	1765	1625	92.1%
Nottingham City Hospital	548	502	91.6%
James Cook University Hospital	886	791	89.3%
Harefield Hospital	1038	925	89.1%
Bristol Royal Infirmary	1186	1055	89.0%
Papworth Hospital	1644	1447	88.0%
King's College Hospital	798	690	86.5%
Barts and the London	2001	1729	86.4%
Freeman Hospital	611	511	83.6%
Derriford Hospital	1058	878	83.0%
University Hospital Coventry	609	492	80.8%
Royal Sussex County Hospital	593	477	80.4%
Southampton General Hospital	1180	947	80.3%
Glenfield Hospital	974	776	79.7%
University Hospital of Wales	650	506	77.8%
St George's Hospital	670	517	77.2%
University Hospital of North Staffordshire	672	517	76.9%
Morriston Hospital	572	438	76.6%
Leeds General Infirmary	866	644	74.4%
St Thomas' Hospital	1138	833	73.2%
Hammersmith Hospital	619	451	72.9%
Royal Victoria Hospital	803	569	70.9%
Northern General Hospital	884	624	70.6%
Castle Hill Hospital	837	561	67.0%
Spire Southampton Hospital (PP)	612	364	59.5%
Manchester Royal Infirmary	679	401	59.1%
Queen Elizabeth Hospital	611	261	42.7%

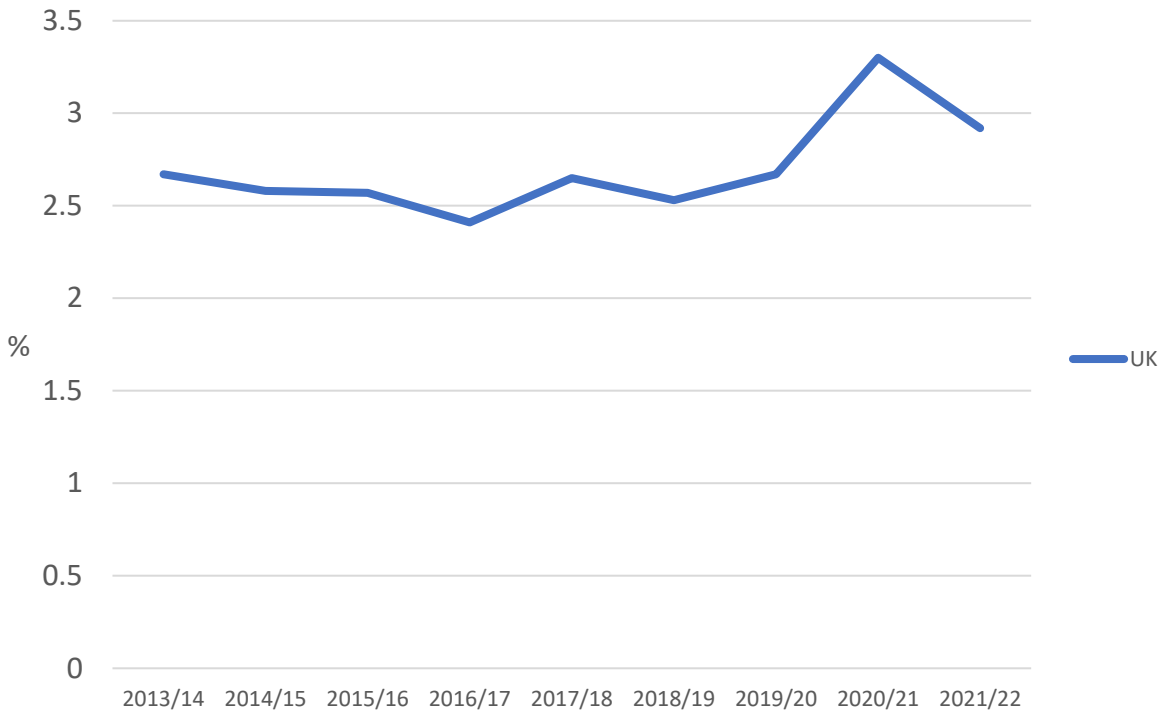
Ranked by highest proportion of cases performed compared to pre-COVID-19. UK mean was 83.9%. Four hospitals performed more cases last year compared to the year before the pandemic. PP private hospital.

Case Numbers performed (%) in 2021/22 compared to pre-Covid year (2019/20) – Unit level



Four hospitals performed more cases last year than they did in the year prior to the pandemic (yellow). UK mean was 83.9%.

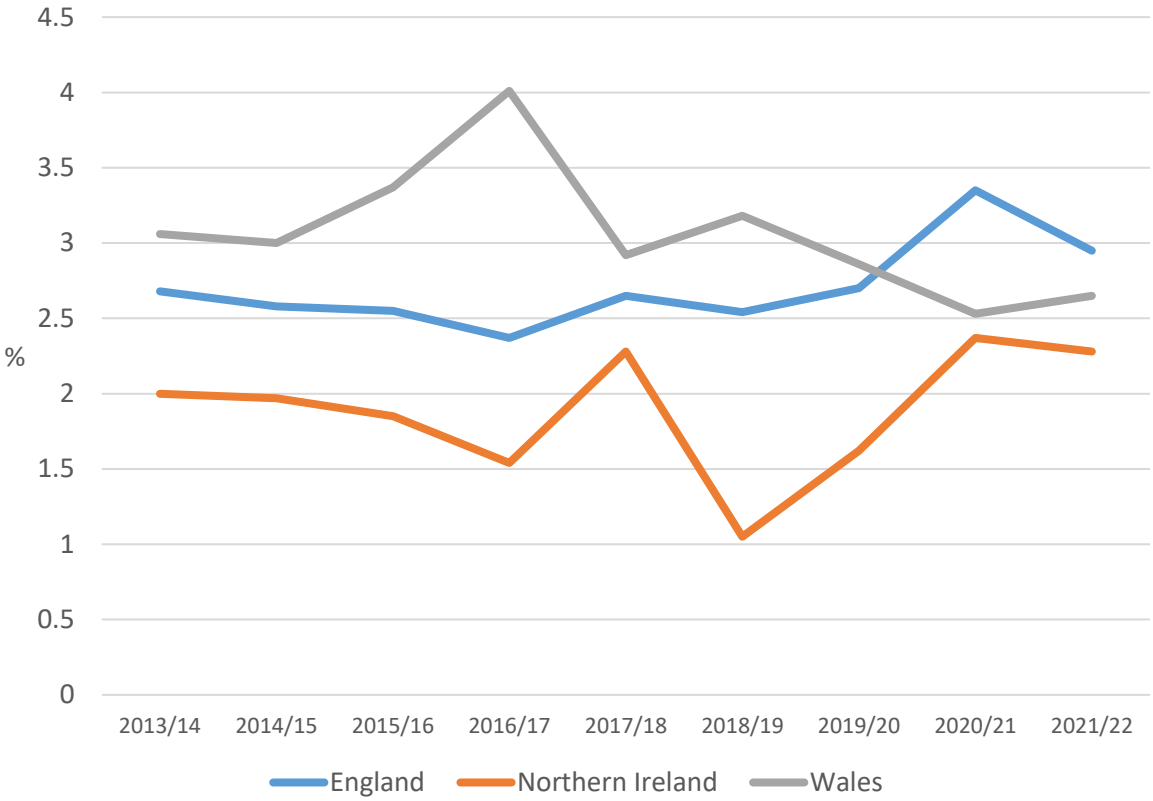
Crude Mortality Rate (%) – All Procedures (including emergencies) – UK (by year)



	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
UK (excl Scotland)	2.67	2.58	2.57	2.41	2.65	2.53	2.67	3.3	2.92

In Hospital mortality rate (%) following all cardiac surgery (i.e. during same admission as operation).

Crude Mortality Rate (%) – All Procedures (including emergencies) by UK region

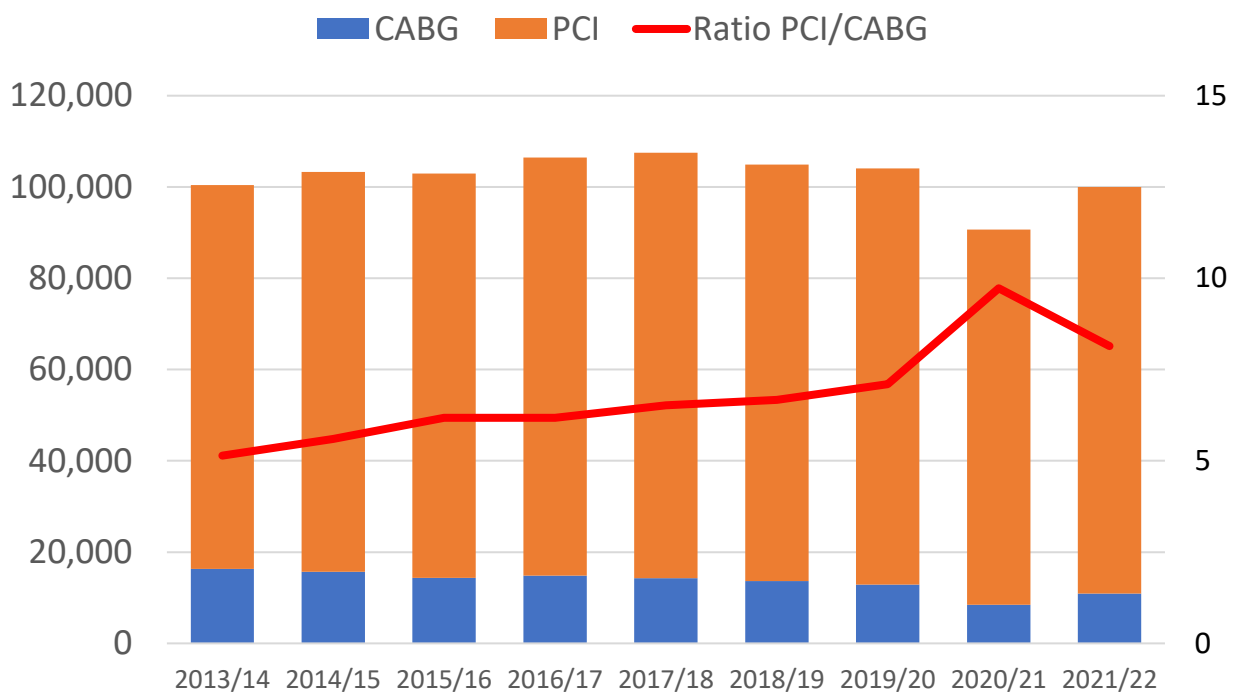


Nation	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excl Scotland)	2.67	2.58	2.57	2.41	2.65	2.53	2.67	3.3	2.92
England	2.68	2.58	2.55	2.37	2.65	2.54	2.7	3.35	2.95
Northern Ireland	2	1.97	1.85	1.54	2.28	1.05	1.62	2.37	2.28
Wales	3.06	3	3.37	4.01	2.92	3.18	2.86	2.53	2.65

In Hospital mortality rate (%) following all cardiac surgery (i.e. during same admission as operation).

Coronary Artery Bypass Surgery (CABG) – Trends and Outcomes

Trends in Revascularisation numbers (UK excluding Scotland) since 2013 with ratio of PCI to CABG – by year

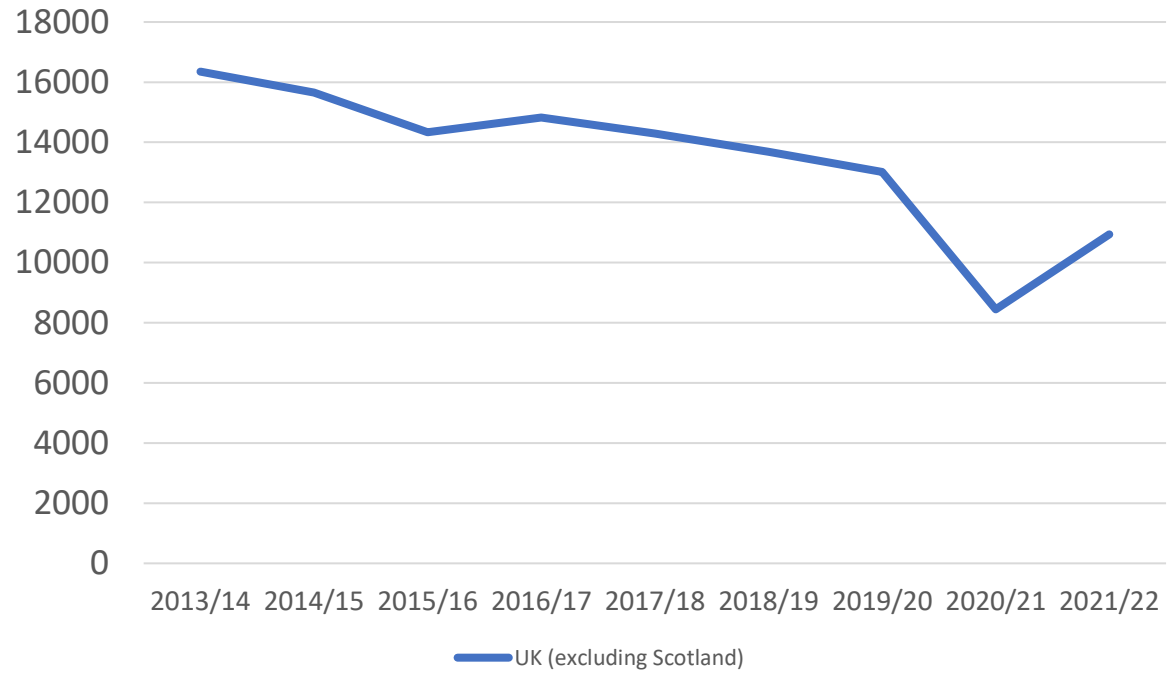


CABG coronary artery bypass grafts; PCI percutaneous coronary intervention

	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
CABG	16350	15653	14332	14826	14291	13685	12852	8451	10942
PCI	84074	87644	88607	91638	93185	91227	91181	82188	89079
Ratio PCI/CABG	5.1	5.6	6.2	6.2	6.5	6.7	7.1	9.7	8.1

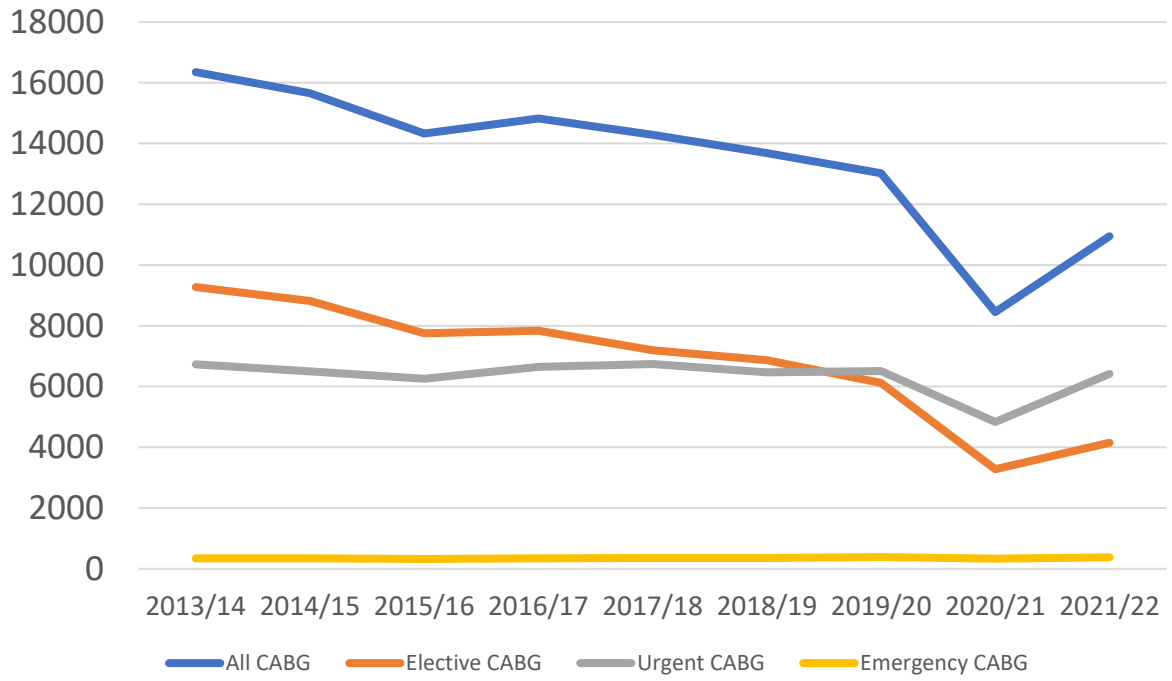
Isolated first time CABG (Coronary artery bypass grafts)

Isolated CABG numbers (including emergencies) – by year (UK and by nation)



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	16350	15653	14332	14826	14291	13685	13018	8451	10942
England	15265	14747	13419	13927	13462	12903	12239	8051	10404
Northern Ireland	503	413	395	365	330	294	296	172	160
Wales	582	493	518	534	499	488	483	222	378

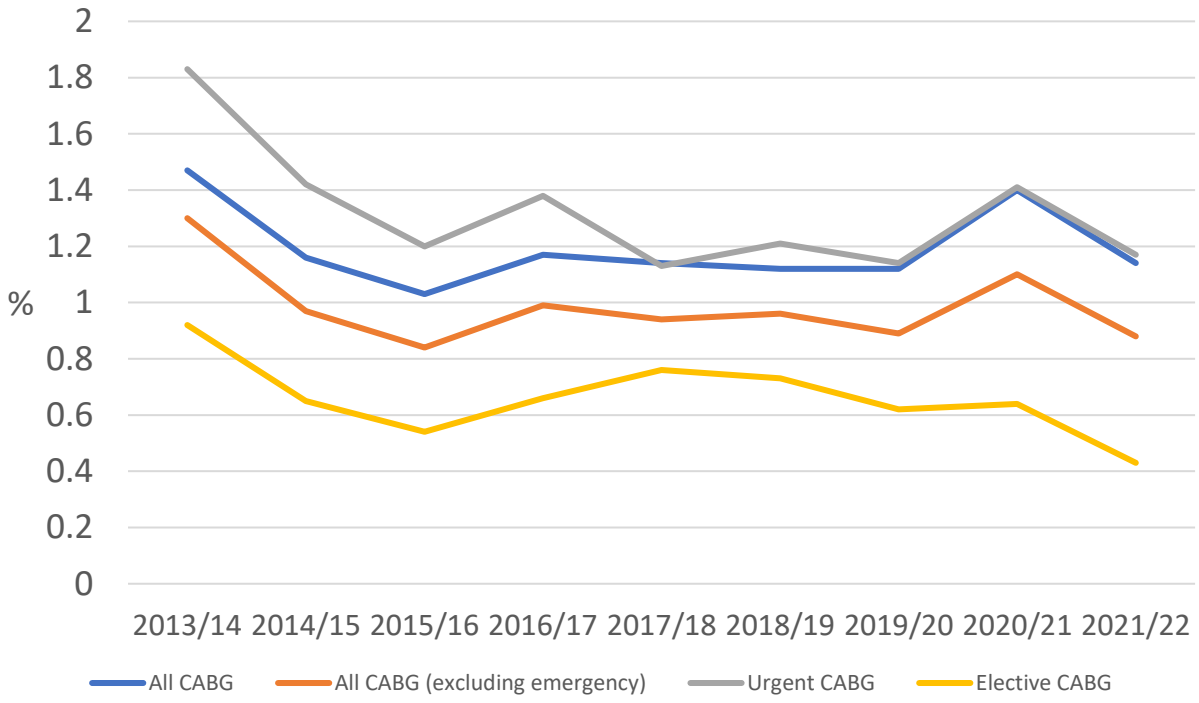
Isolated CABG operations in UK – by operative urgency (by year)



	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
All CABG	16350	15653	14332	14826	14291	13685	13018	8451	10942
Elective CABG	9274	8813	7754	7838	7195	6869	6118	3278	4154
Urgent CABG	6734	6496	6254	6647	6741	6465	6514	4835	6411
Emergency CABG	342	344	324	341	355	351	386	338	377

UK data (excluding Scotland).

Crude mortality rates (%) following isolated CABG operations in the UK – by operative urgency and by year



	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22
All CABG	1.47	1.16	1.03	1.17	1.14	1.12	1.12	1.4	1.14
All CABG (excluding emergency)	1.3	0.97	0.84	0.99	0.94	0.96	0.89	1.1	0.88
Urgent CABG	1.83	1.42	1.2	1.38	1.13	1.21	1.14	1.41	1.17
Elective CABG	0.92	0.65	0.54	0.66	0.76	0.73	0.62	0.64	0.43

UK data (excluding Scotland). All CABG includes emergencies.

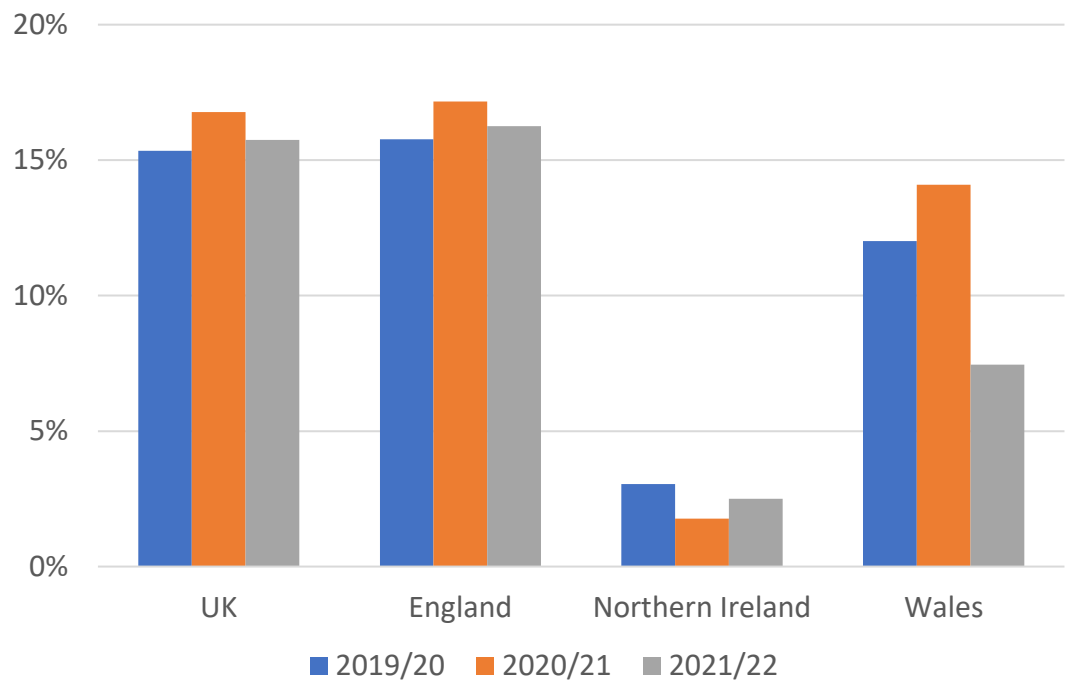
Isolated CABG numbers (including emergencies) per year– Unit level

Hospital	2013 /14	2014 /15	2015 /16	2016 /17	2017 /18	2018 /19	2019 /20	2020 /21	2021 /22
Spire St Anthony's Hospital (PP)	149	185	111	53	53	47	25	6	24
Barts and the London	561	512	731	852	885	1002	959	688	798
Basildon Hospital	527	507	422	392	334	381	314	228	334
Liverpool Heart and Chest Hospital	919	877	901	952	939	773	793	513	745
Bristol Royal Infirmary	731	663	553	529	503	505	443	364	440
Spire Southampton Hospital (PP)	236	146	126	150	133	124	194	55	79
Castle Hill Hospital	387	373	367	334	321	412	452	241	309
Nottingham City Hospital	322	260	221	206	254	274	223	194	210
Freeman Hospital	278	272	291	256	283	260	230	226	172
St George's Hospital	501	448	502	569	531	399	363	167	294
Glenfield Hospital	507	511	516	460	478	444	444	220	326
Hammersmith Hospital	446	363	354	327	296	331	322	188	257
Harefield Hospital	490	475	406	459	473	462	464	441	463
Wellington Hospital North (PP)	92	108	72	48	49	No data	No data	No data	No data
Harley Street Clinic (PP)	47	66	41	45	35	No data	No data	No data	No data
King's College Hospital	399	501	424	461	397	349	395	204	311
London Bridge Hospital (PP)	117	84	67	82	40	No data	No data	No data	No data
Leeds General Infirmary	589	541	36	471	576	520	463	251	264
Morriston Hospital	280	258	242	271	265	242	243	113	174
Manchester Royal Infirmary	343	411	326	388	462	398	352	233	272
New Cross Hospital	494	468	443	458	404	473	429	268	409

Northern General Hospital	443	432	395	364	356	300	319	161	198
Royal Brompton Hospital	336	418	419	407	385	429	394	288	407
Papworth Hospital	847	823	768	754	735	671	580	394	542
Derriford Hospital	589	484	562	522	408	349	307	268	293
Queen Elizabeth Hospital	231	278	257	322	294	310	269	122	102
John Radcliffe Hospital	396	373	364	364	388	342	318	195	319
Royal Sussex County Hospital	307	269	308	313	286	285	274	139	204
Royal Victoria Hospital	503	413	395	365	330	294	296	172	160
James Cook University Hospital	582	589	571	568	527	527	530	356	437
Southampton General Hospital	472	475	486	498	472	507	442	303	346
St Thomas' Hospital	421	455	416	461	407	386	441	214	323
University Hospital of North Staffordshire	478	463	443	452	384	355	334	208	253
University College Hospital	408	377	10	0	0	0	0	0	0
University Hospital of Wales	302	235	276	263	234	246	240	109	204
Blackpool Victoria Hospital	757	641	603	508	575	546	512	450	613
University Hospital Coventry	373	381	349	303	292	277	269	157	250
Wythenshawe Hospital	480	514	556	576	497	443	376	300	407

PP private hospital

Off pump (OPCAB) coronary artery surgery rates – proportion (%) of isolated CABG performed without cardiopulmonary bypass - by year and UK nation



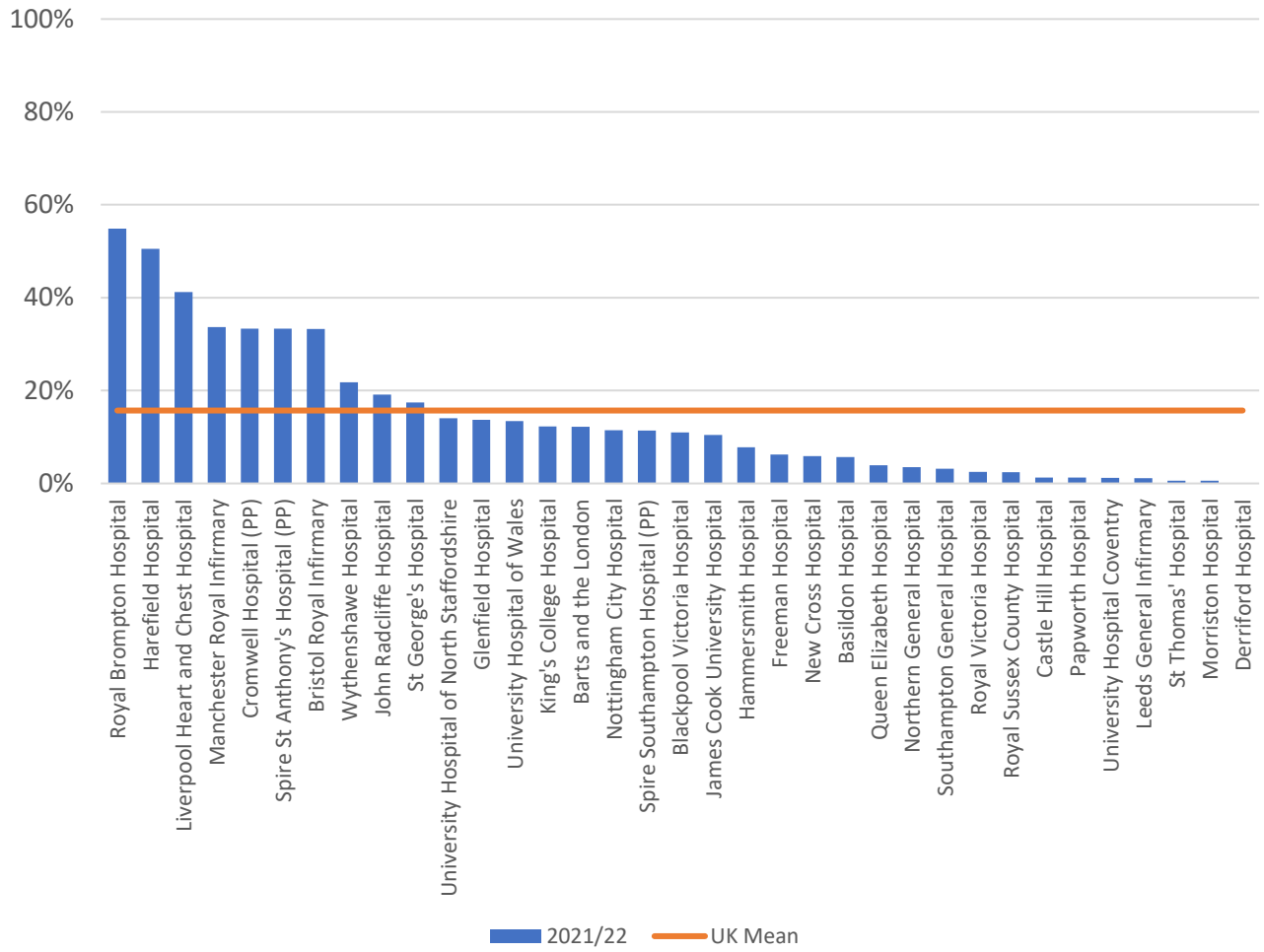
	2019/20	2020/21	2021/22
UK (excluding Scotland)	15.3%	16.8%	15.7%
England	15.8%	17.2%	16.3%
Northern Ireland	3.1%	1.8%	2.5%
Wales	12.0%	14.1%	7.4%

These rates include all cases of isolated CABG where cardiopulmonary bypass is documented as not being used, or where data on bypass and crossclamp times has not been entered (i.e. data is missing). This may overestimate OPCAB rates. An indication of data missing for the use of bypass is given in the next table.

OPCAB rates – by Hospital by year

Hospital	% Missing data for bypass use	2019/20	2020/21	2021/22
Royal Brompton Hospital	0.0%	47.4%	53.8%	54.9%
Harefield Hospital	1.0%	54.5%	53.5%	50.5%
Liverpool Heart and Chest Hospital	43.4%	43.7%	46.3%	41.2%
Manchester Royal Infirmary	6.9%	28.1%	30.6%	33.7%
Cromwell Hospital (PP)	0.0%	66.7%	77.8%	33.3%
Spire St Anthony's Hospital (PP)	12.7%	76.0%	16.7%	33.3%
Bristol Royal Infirmary	21.5%	41.0%	38.8%	33.3%
Wythenshawe Hospital	0.6%	1.9%	14.6%	21.8%
John Radcliffe Hospital	0.5%	22.9%	13.3%	19.1%
St George's Hospital	0.0%	11.4%	16.2%	17.4%
University Hospital of North Staffordshire	1.4%	8.0%	13.0%	14.0%
Glenfield Hospital	2.3%	16.4%	11.4%	13.7%
University Hospital of Wales	7.1%	22.9%	27.8%	13.4%
King's College Hospital	3.9%	19.8%	24.5%	12.3%
Barts and the London	3.7%	7.2%	11.7%	12.2%
Nottingham City Hospital	1.1%	30.4%	14.9%	11.4%
Spire Southampton Hospital (PP)	11.3%	15.7%	7.3%	11.4%
Blackpool Victoria Hospital	0.1%	9.7%	10.2%	10.9%
James Cook University Hospital	0.0%	11.9%	15.6%	10.4%
Hammersmith Hospital	2.9%	8.1%	11.7%	7.8%
Freeman Hospital	0.3%	5.2%	7.1%	6.3%
New Cross Hospital	0.0%	11.9%	4.5%	5.9%
Basildon Hospital	0.0%	6.1%	4.4%	5.7%
Queen Elizabeth Hospital	0.0%	4.9%	4.1%	3.9%
Northern General Hospital	0.4%	4.7%	2.5%	3.5%
Southampton General Hospital	0.1%	1.3%	1.9%	3.2%
Royal Victoria Hospital	0.0%	3.1%	1.8%	2.5%
Royal Sussex County Hospital	4.7%	8.7%	4.3%	2.5%
Castle Hill Hospital	0.0%	0.7%	0.8%	1.3%
Papworth Hospital	0.9%	1.9%	2.8%	1.3%
University Hospital Coventry	0.1%	25.4%	5.1%	1.2%
Leeds General Infirmary	0.0%	1.7%	0.8%	1.1%
St Thomas' Hospital	0.0%	0.5%	0.0%	0.6%
Morriston Hospital	0.4%	1.2%	0.9%	0.6%
Derriford Hospital	2.4%	0.3%	7.8%	0.0%

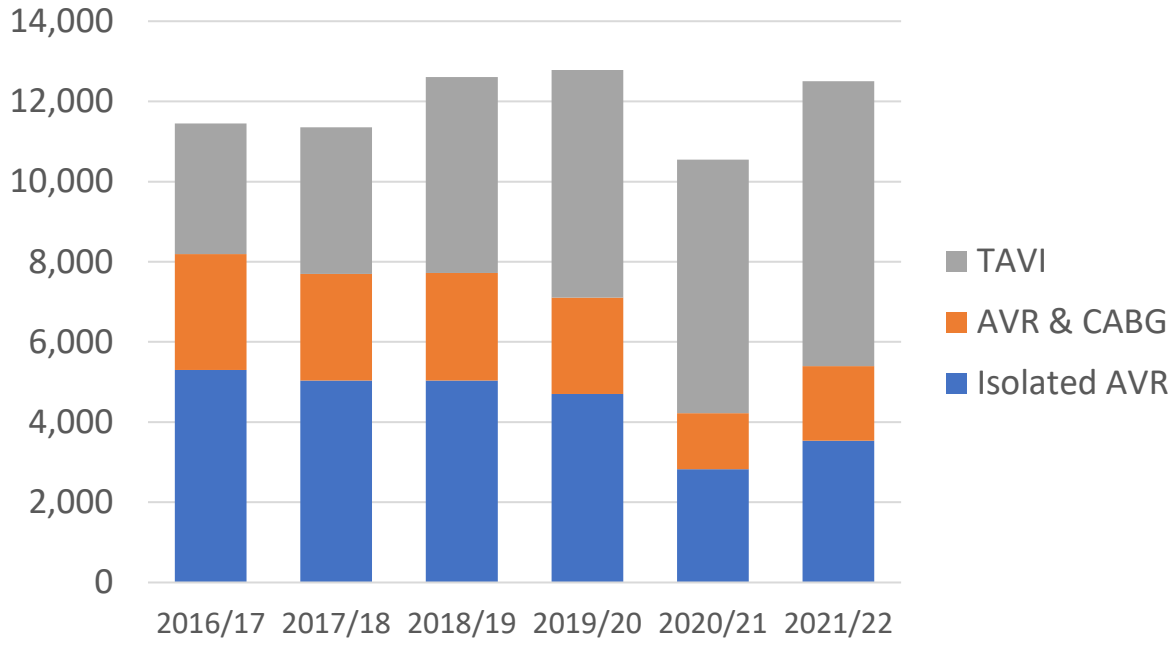
Ranked by OPCAB rate in 2021/22. These rates include all cases of isolated CABG where cardiopulmonary bypass is documented as not being used, or where data on bypass and crossclamp times has not been entered (i.e. data is missing). This may overestimate OPCAB rates. 3 year aggregate (2019/22) missing data (%) for use of bypass is shown.

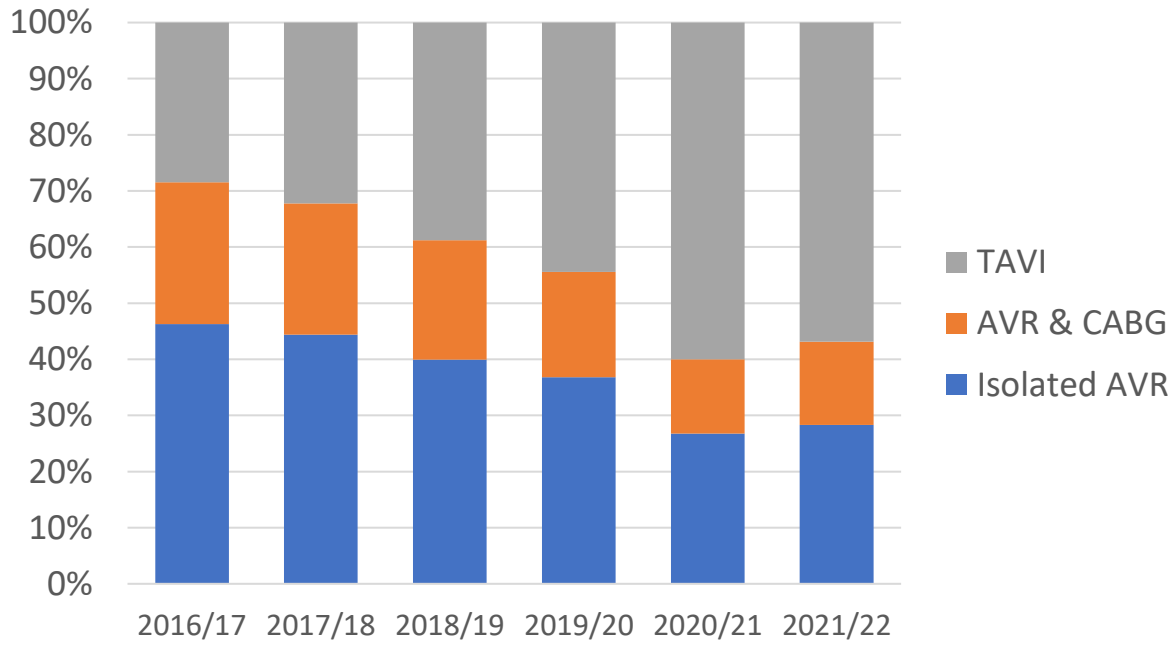


OPCAB rates by Hospital in 2021/22. UK mean 15.7%.

Aortic Valve Surgery (AVR) – Trends and Outcomes

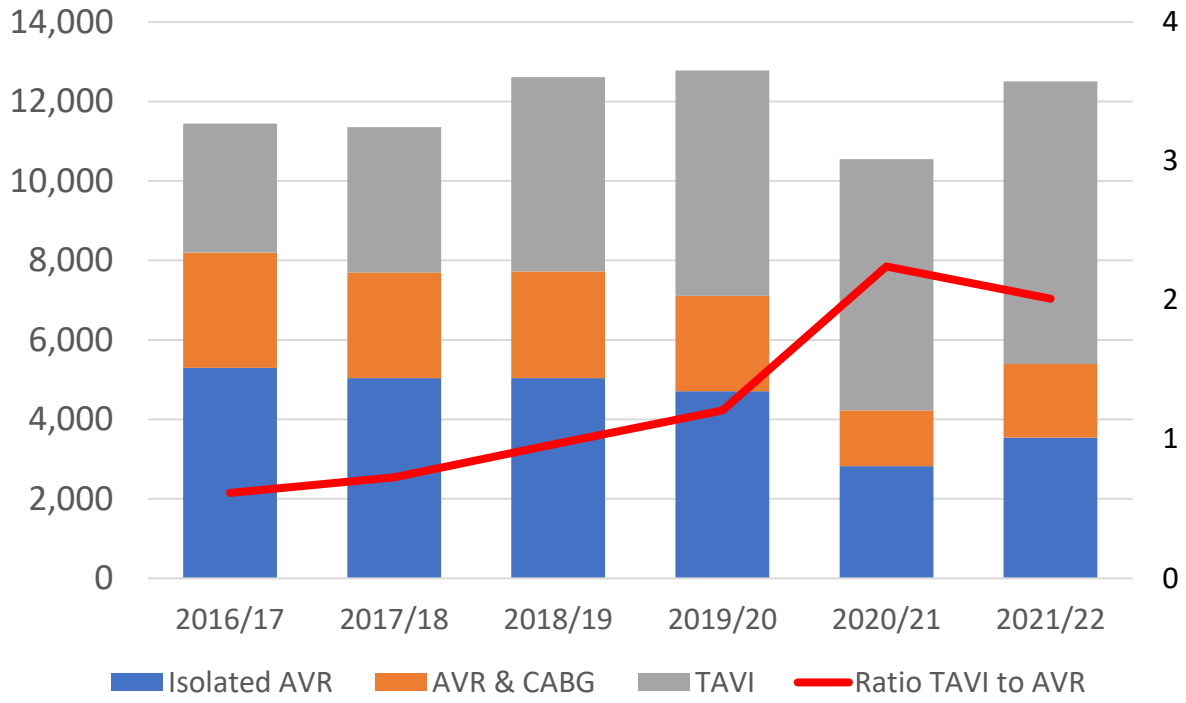
Trends in AVR and TAVI numbers (UK excluding Scotland) since 2013– by year





TAVI transcatheter aortic valve implantation; AVR aortic valve replacement; CABG coronary artery bypass grafting

Ratio of TAVI to AVR since 2013 – UK (excluding Scotland), by year

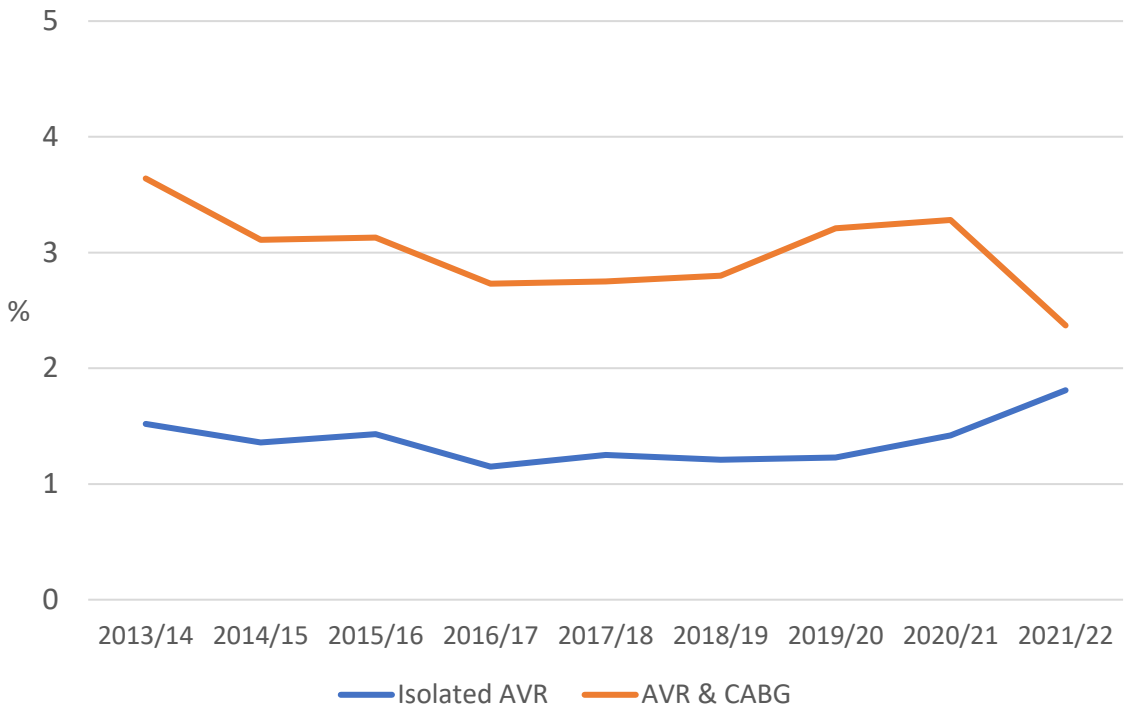


TAVI transcatheter aortic valve implantation; AVR aortic valve replacement; CABG coronary artery bypass grafting

	2016/17	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
Isolated AVR	5297	5041	5039	4705	2822	3538
AVR & CABG	2896	2657	2682	2401	1401	1855
TAVI	3254	3655	4887	5676	6328	7111
Ratio TAVI to AVR	0.61	0.73	0.97	1.21	2.24	2.01

UK data (excluding Scotland)

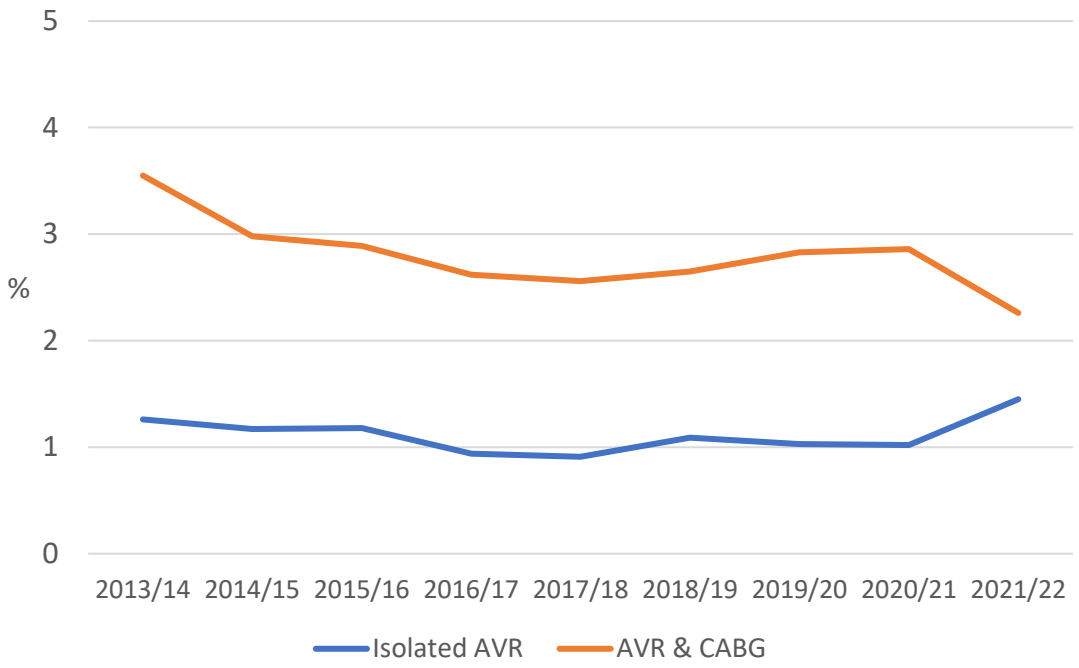
Crude mortality rates (%) after isolated AVR and AVR & CABG (including emergencies) – UK (by year)



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Isolated AVR	1.52	1.36	1.43	1.15	1.25	1.21	1.23	1.42	1.81
AVR & CABG	3.64	3.11	3.13	2.73	2.75	2.8	3.21	3.28	2.37

Mortality rate (%) after all cases (includes emergencies).

Crude mortality rates (%) after isolated AVR and AVR & CABG (excluding emergencies) – UK (by year)



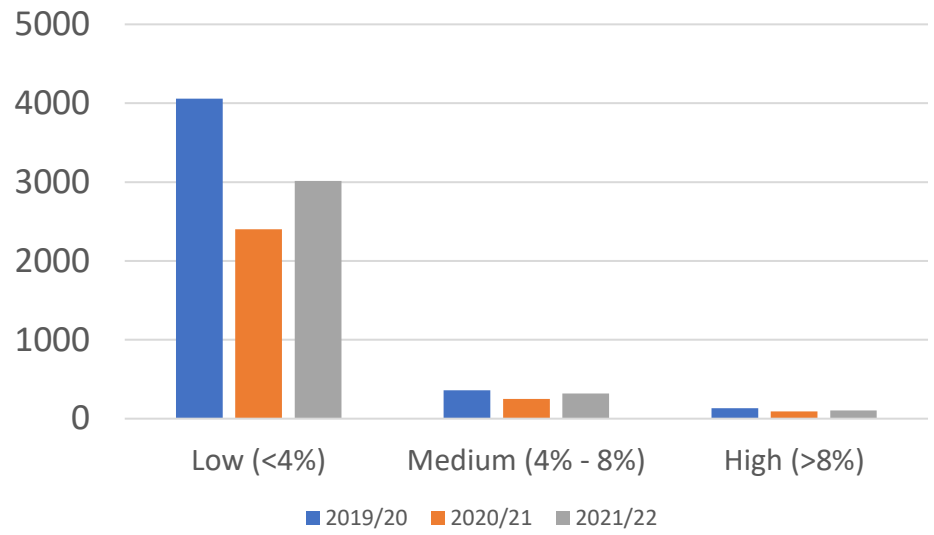
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Isolated AVR	1.26	1.17	1.18	0.94	0.91	1.09	1.03	1.02	1.45
AVR & CABG	3.55	2.98	2.89	2.62	2.56	2.65	2.83	2.86	2.26

Mortality % following elective and urgent cases (excludes emergencies).

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Isolated AVR	4852	5149	5010	5193	4938	4947	4546	2744	3439
AVR & CABG	3099	3150	2911	2863	2616	2642	2365	1365	1812

UK cases (excluding Scotland). Elective and urgent cases only.

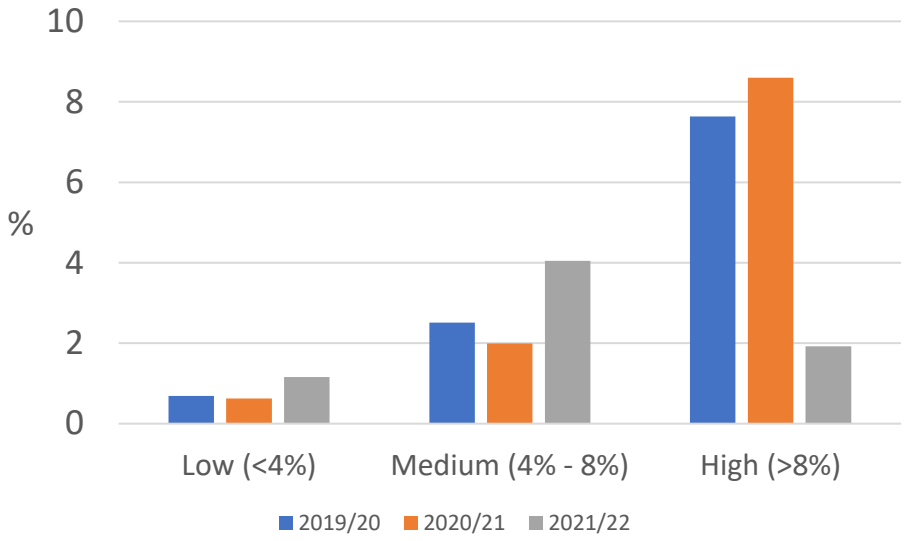
Numbers of isolated AVR operations by risk category (Low, Medium, High by EuroSCORE 2) in the UK – last three years



UK	Low (<4%)	Medium (4% - 8%)	High (>8%)
2019/20	4057	358	131
2020/21	2400	251	93
2021/22	3014	321	104

Preoperative risk according to EuroSCORE 2.

Mortality (%) following isolated AVR by risk category (Low, Medium, High by EuroSCORE 2) in the UK – last three years

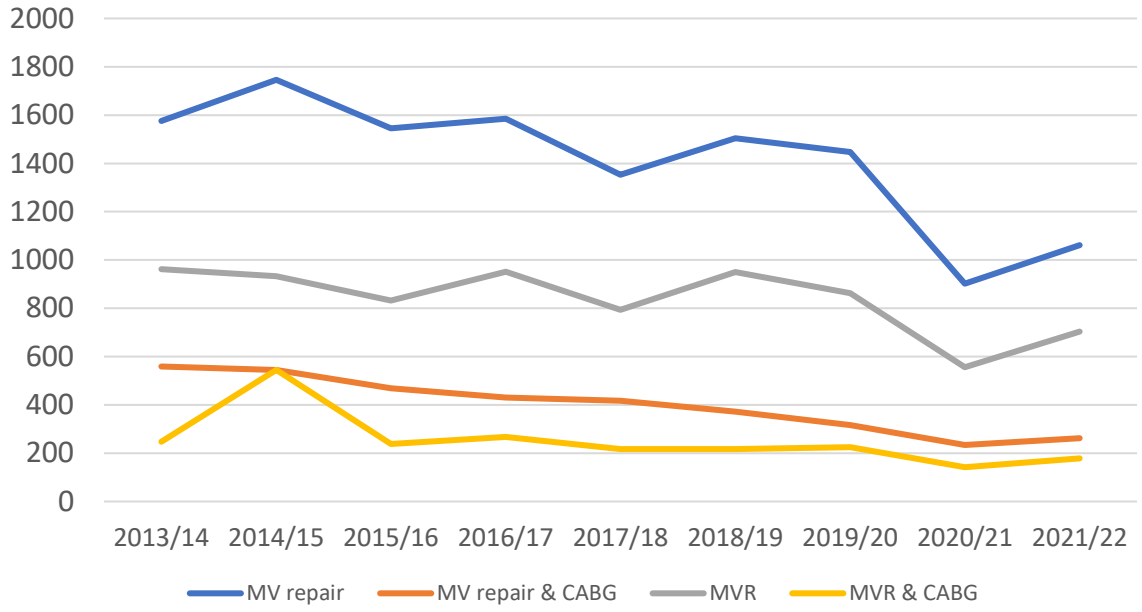


UK	Low (<4%)	Medium (4% - 8%)	High (>8%)
2019/20	0.69	2.51	7.63
2020/21	0.63	1.99	8.60
2021/22	1.16	4.05	1.92

Preoperative risk according to EuroSCORE 2. For case numbers see previous table.

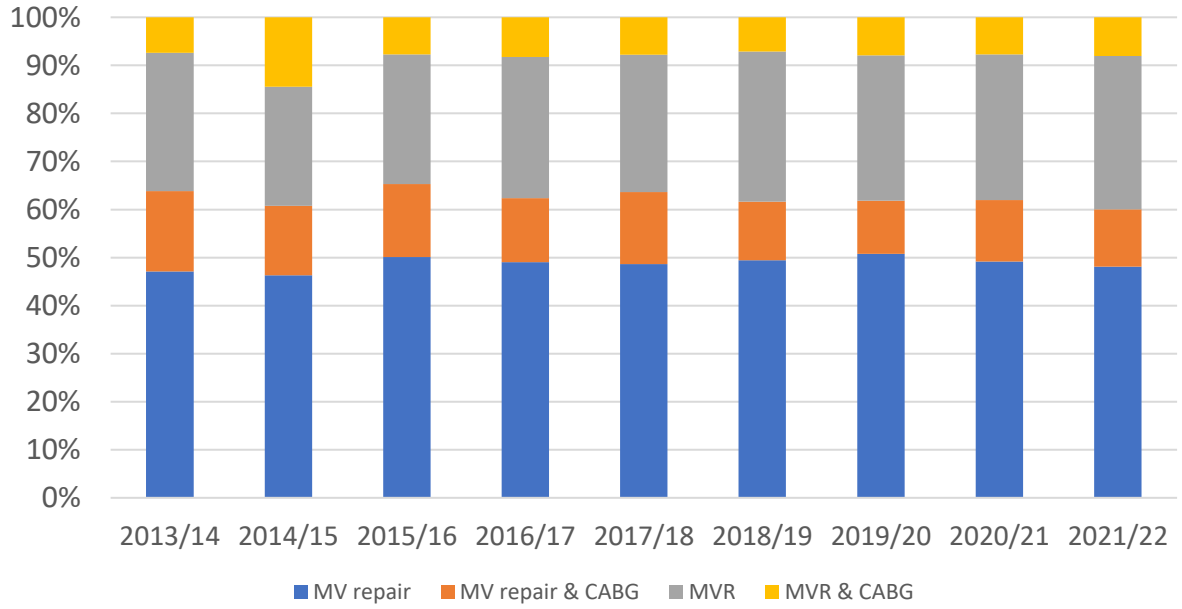
Mitral Valve (MVR) Surgery – Trends and Outcomes

Numbers of Mitral operations (with and without CABG) – UK (by year)

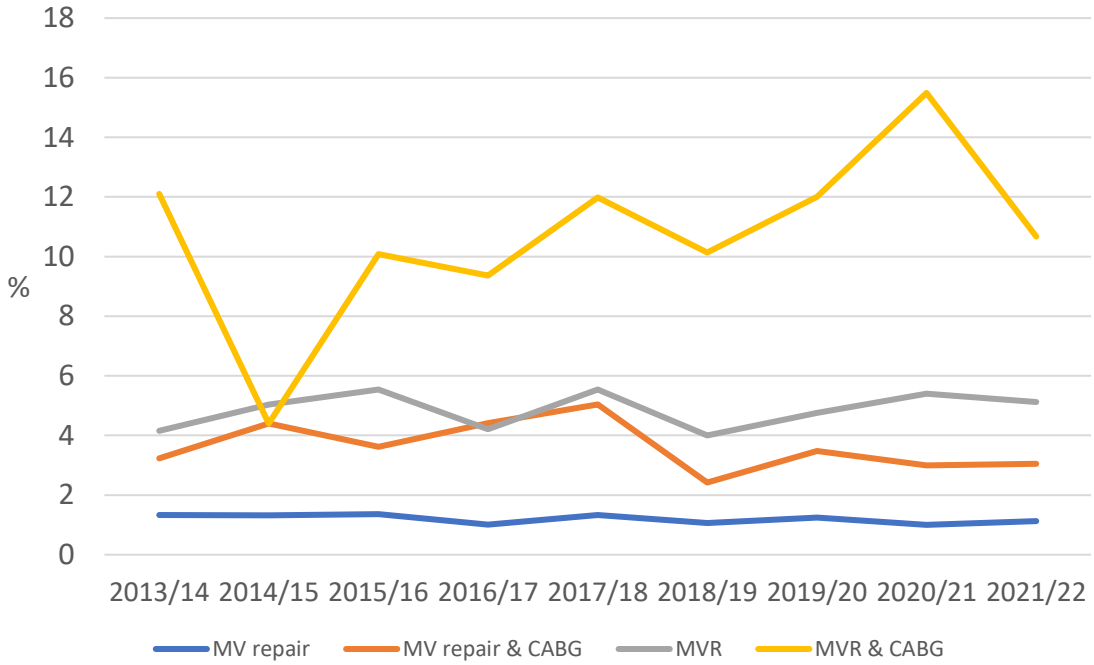


	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MV repair	1576	1746	1545	1585	1353	1504	1447	902	1061
MV repair & CABG	559	545	469	431	417	372	316	234	262
MVR	962	933	832	951	794	950	862	556	703
MVR & CABG	248	545	238	267	217	217	225	142	178

MV mitral valve; MVR mitral valve replacement. Data excludes concomitant procedures (except CABG).



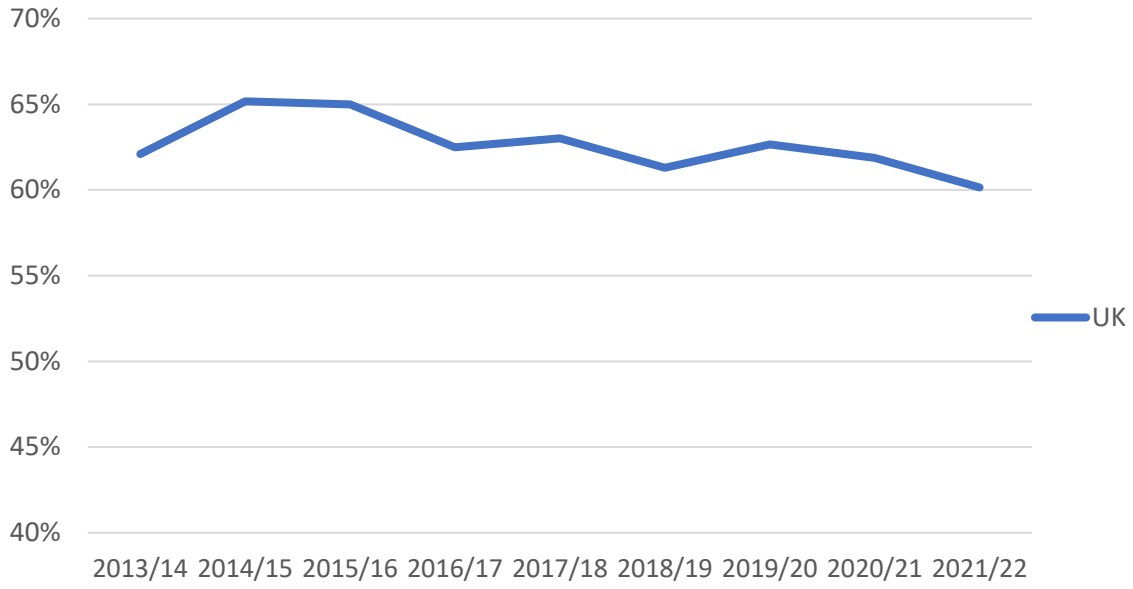
Crude mortality rates (%) after Mitral operations (with and without CABG, includes emergencies) – UK (by year)



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
MV repair	1.33	1.32	1.36	1.01	1.33	1.06	1.24	1.0	1.13
MV repair & CABG	3.23	4.4	3.62	4.41	5.04	2.42	3.48	2.99	3.05
MVR	4.16	5.04	5.54	4.21	5.54	4.0	4.76	5.4	5.12
MVR & CABG	12.1	4.4	10.08	9.36	11.98	10.14	12.0	15.49	10.67

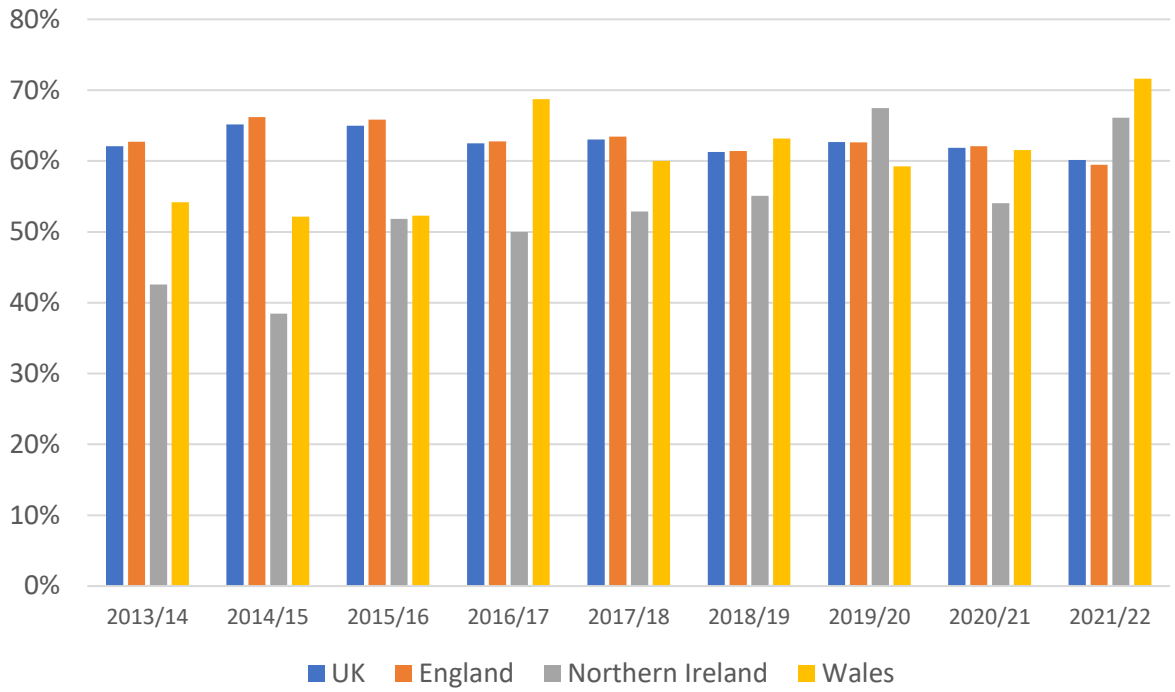
MV mitral valve; MVR mitral valve replacement

Mitral valve repair rate (%) as a proportion of all isolated mitral procedures



	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
MV repair	1576	1746	1545	1585	1353	1504	1447	902	1061
MVR	962	933	832	951	794	950	862	556	703
Repair rate (%)	62.1%	65.2%	65.0%	62.5%	63.0%	61.3%	62.7%	61.9%	60.1%

Isolated mitral repair as proportion of isolated mitral procedures. Excludes cases with concomitant procedures (CABG etc). MVR mitral valve replacement.

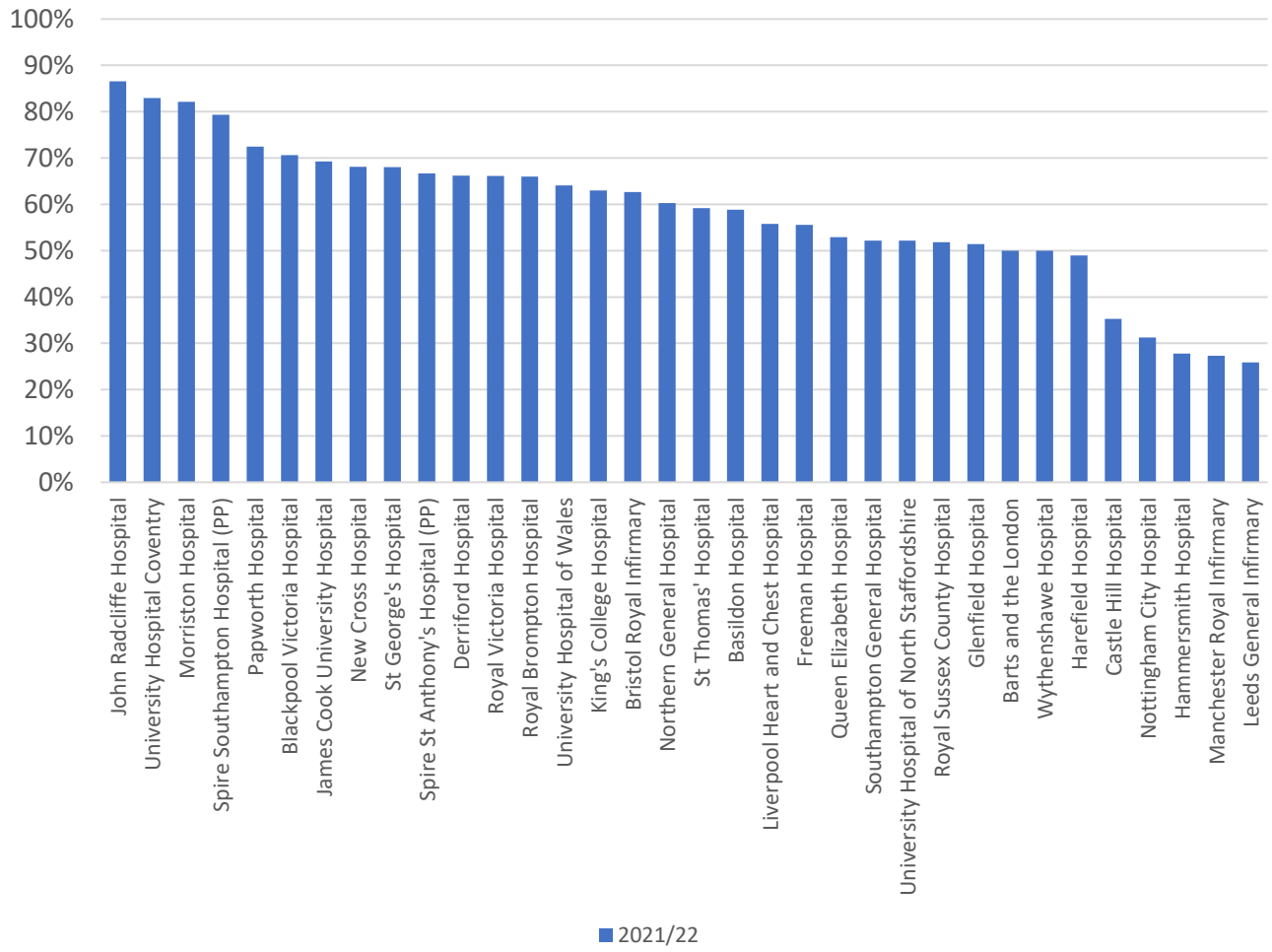


	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK	62.1 %	65.2 %	65.0 %	62.5 %	63.0 %	61.3 %	62.7 %	61.9 %	60.1 %
England	62.7 %	66.2 %	65.8 %	62.8 %	63.4 %	61.4 %	62.6 %	62.1 %	59.5 %
Northern Ireland	42.6 %	38.5 %	51.9 %	50.0 %	52.9 %	55.1 %	67.5 %	54.1 %	66.1 %
Wales	54.2 %	52.1 %	52.3 %	68.8 %	60.0 %	63.2 %	59.3 %	61.5 %	71.6 %

Mitral repair rate (%). Excludes cases with concomitant procedures (CABG etc).

	Isolated MV repair (n)			Mitral repair rate (%)		
Hospital	**2019/20**	**2020/21**	**2021/22**	**2019/20**	**2020/21**	**2021/22**
John Radcliffe Hospital	53	26	45	72.6%	70.3%	86.5%
University Hospital Coventry	74	32	34	89.2%	82.1%	82.9%
Morriston Hospital	16	16	23	61.5%	69.6%	82.1%
Spire Southampton Hospital (PP)	53	25	50	84.1%	83.3%	79.4%
Papworth Hospital	113	106	92	67.3%	73.6%	72.4%
Blackpool Victoria Hospital	72	47	36	73.5%	77.0%	70.6%
James Cook University Hospital	26	31	36	57.8%	66.0%	69.2%
New Cross Hospital	45	22	32	65.2%	71.0%	68.1%
St George's Hospital	13	13	17	54.2%	46.4%	68.0%
Spire St Anthony's Hospital (PP)	3	2	2	75.0%	100.0%	66.7%
Derriford Hospital	69	38	47	71.1%	61.3%	66.2%
Royal Victoria Hospital	56	20	39	67.5%	54.1%	66.1%
Royal Brompton Hospital	53	62	62	68.8%	76.5%	66.0%
University Hospital of Wales	32	24	25	58.2%	57.1%	64.1%
King's College Hospital	37	19	34	72.5%	50.0%	63.0%
Bristol Royal Infirmary	72	50	57	74.2%	83.3%	62.6%
Northern General Hospital	53	39	41	66.3%	76.5%	60.3%
St Thomas' Hospital	65	23	42	65.0%	59.0%	59.2%
Basildon Hospital	46	22	30	74.2%	84.6%	58.8%
Liverpool Heart and Chest Hospital	82	42	58	57.7%	70.0%	55.8%
Freeman Hospital	28	23	25	58.3%	59.0%	55.6%
Queen Elizabeth Hospital	36	18	9	70.6%	66.7%	52.9%
Southampton General Hospital	24	13	24	64.9%	41.9%	52.2%
University Hospital of North Staffordshire	16	8	12	51.6%	44.4%	52.2%
Royal Sussex County Hospital	30	15	14	65.2%	55.6%	51.9%
Glenfield Hospital	22	16	18	45.8%	41.0%	51.4%
Barts and the London	67	40	61	40.1%	43.5%	50.0%
Wythenshawe Hospital	27	15	27	73.0%	55.6%	50.0%
Harefield Hospital	55	44	24	66.3%	64.7%	49.0%
Castle Hill Hospital	20	11	6	57.1%	55.0%	35.3%
Nottingham City Hospital	14	13	10	42.4%	43.3%	31.3%
Hammersmith Hospital	33	14	10	40.2%	40.0%	27.8%
Manchester Royal Infirmary	14	7	3	33.3%	46.7%	27.3%
Leeds General Infirmary	28	5	15	38.9%	9.8%	25.9%

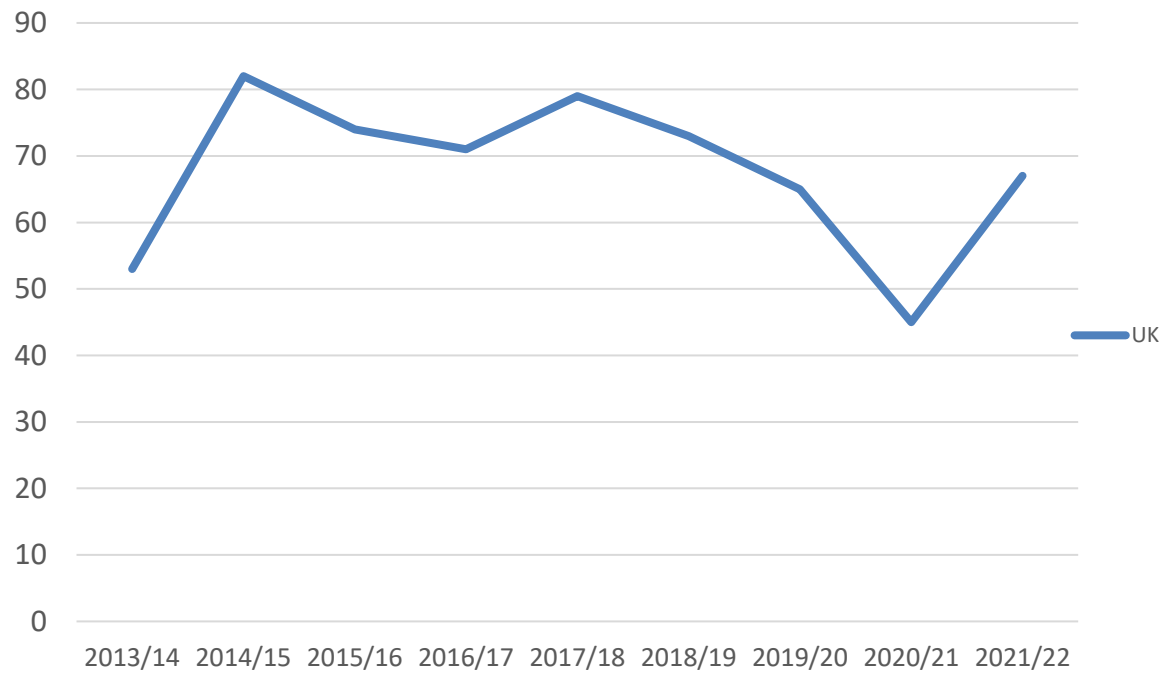
Isolated MV repair rate as proportion of all isolated mitral procedures. Ranked by highest repair rate in 2021/22. PP private hospital.



Mitral repair rate (%) in 2021/22. (Excludes concomitant procedures).

Tricuspid Valve (TVR) Surgery – Trends and Outcomes

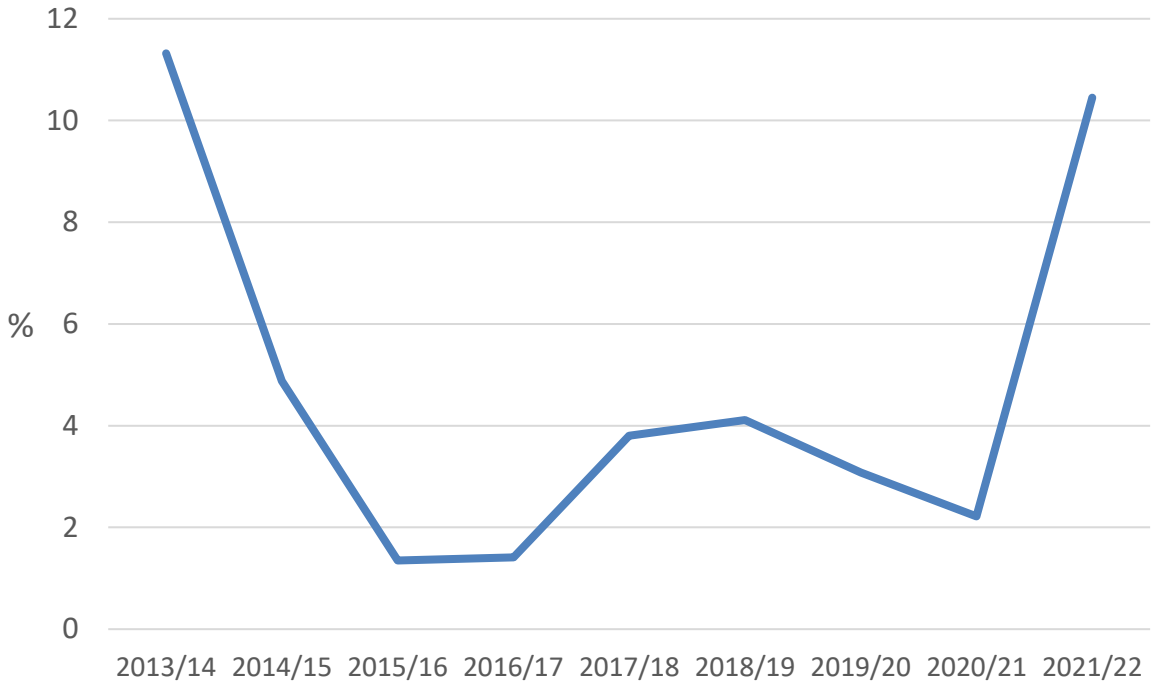
Isolated Tricuspid Valve surgery – cases performed per year (by nation)



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	53	82	74	71	79	73	65	45	67
England	47	71	68	63	70	66	58	39	58
Northern Ireland	4	8	4	6	1	3	3	1	5
Republic of Ireland	1	0	0	0	4	4	3	2	2
Wales	1	3	2	2	4	0	1	3	2

Isolated TV surgery (excludes concomitant procedures – CABG, MVR etc).

Isolated Tricuspid Valve surgery – mortality rate (by year)

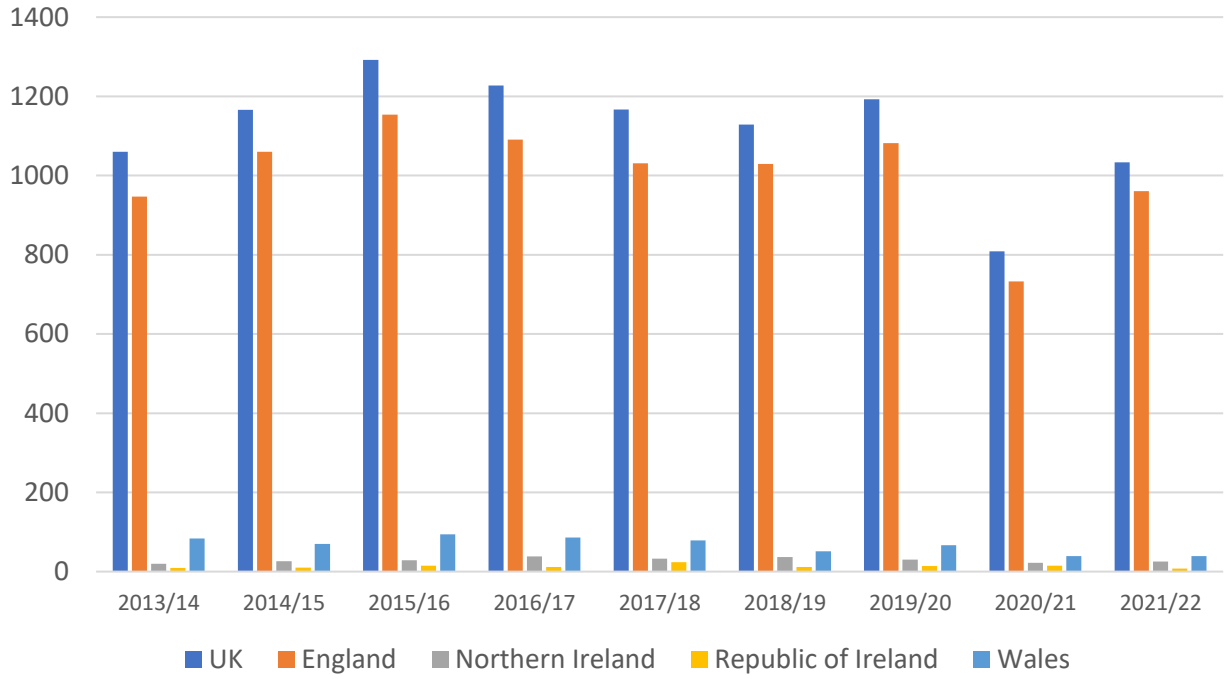


UK (excluding Scotland) mortality rate for isolated tricuspid valve surgery (%)

Nations	**2013/ 14**	**2014/ 15**	**2015/ 16**	**2016/ 17**	**2017/ 18**	**2018/ 19**	**2019/ 20**	**2020/ 21**	**2021/ 22**
UK	11.3	4.9	1.4	1.4	3.8	4.1	3.1	2.2	10.5
England	12.8	5.6	1.5	1.6	4.3	4.6	3.5	2.6	12.1
Northern Ireland	0	0	0	0	0	0	0	0	0
Republic of Ireland	0	0	0	0	0	0	0	0	0
Wales	0	0	0	0	0	0	0	0	0

Isolated TV surgery mortality rate % (excludes concomitant procedures – CABG, MVR etc).

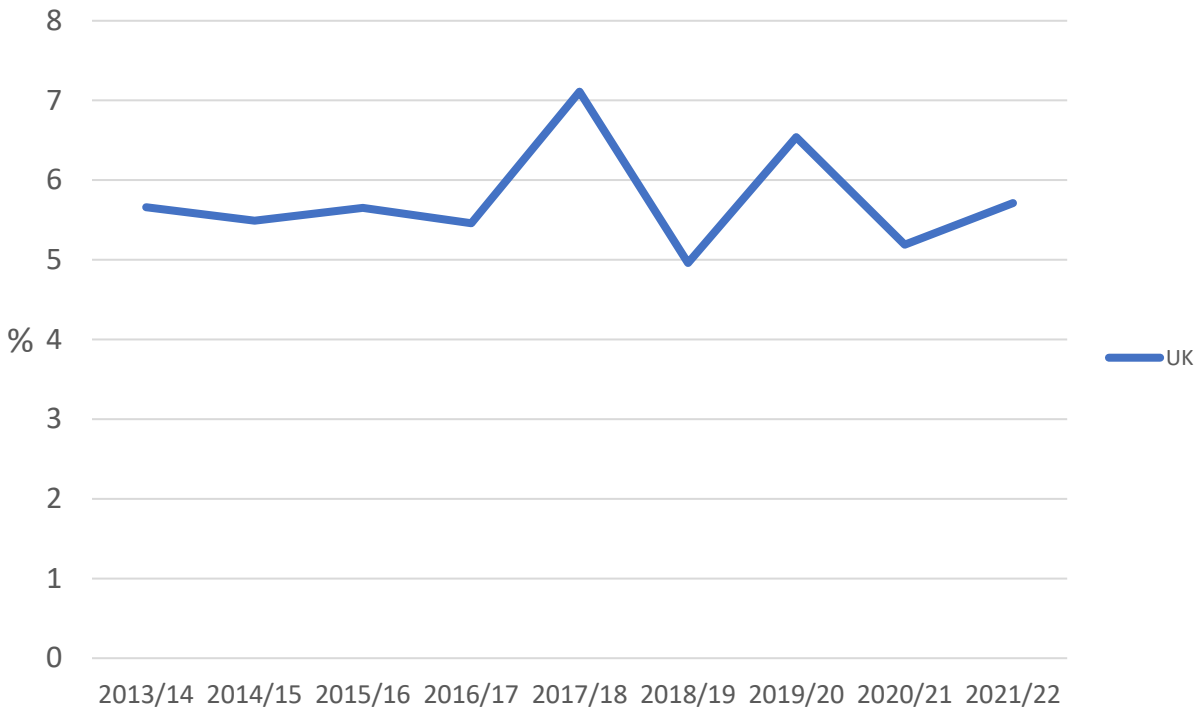
Tricuspid Valve surgery (Any) - cases per year (by nation)



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	1060	1166	1292	1227	1167	1129	1193	809	1033
England	947	1060	1154	1091	1031	1029	1082	733	961
Northern Ireland	20	26	29	38	33	37	30	22	25
Republic of Ireland	9	10	15	12	24	12	14	15	8
Wales	84	70	94	86	79	51	67	39	39

All cases involving surgery on the Tricuspid Valve (includes all concomitant procedures).

Mortality rate (%) following Tricuspid Valve surgery (Any) – by year



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	5.7	5.5	5.7	5.5	7.1	5.0	6.5	5.2	5.7
England	5.8	5.8	5.8	5.3	7.1	4.9	6.4	5.3	5.8
Northern Ireland	5.0	0	3.5	7.9	9.1	2.7	10.0	4.6	0
Republic of Ireland	0	10.0	0	8.3	12.5	16.7	0	0	0
Wales	4.8	2.9	5.3	5.8	5.1	5.9	9.0	5.1	7.7

Mortality (%) following All cases involving surgery on the Tricuspid Valve (includes all concomitant procedures).

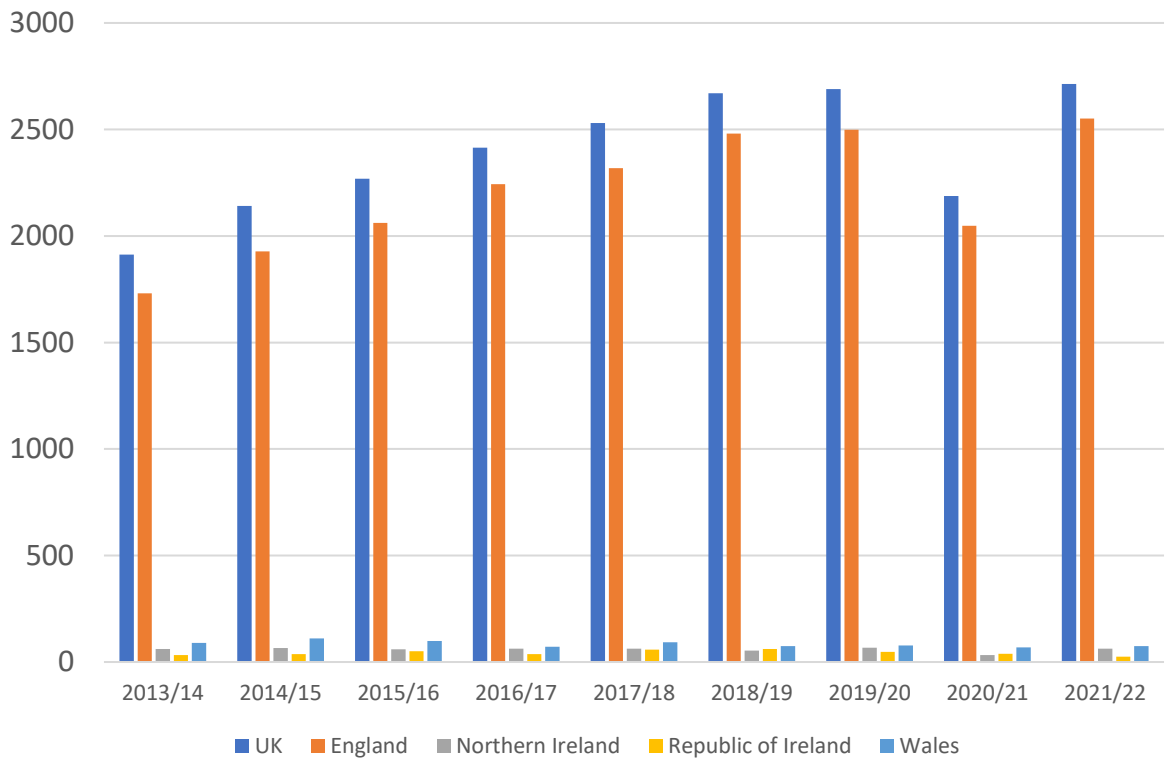
Tricuspid Valve surgery (Any) rates - by hospital and year

Hospital	2019/20	2020/21	2021/22
New Cross Hospital	84	58	79
John Radcliffe Hospital	40	46	77
Papworth Hospital	80	39	67
Barts and the London	55	38	62
Royal Brompton Hospital	28	39	59
King's College Hospital	50	43	57
Harefield Hospital	72	56	43
Wythenshawe Hospital	43	30	42
Liverpool Heart and Chest Hospital	68	26	41
Southampton General Hospital	41	16	38
Northern General Hospital	30	25	37
Blackpool Victoria Hospital	41	34	37
St Thomas' Hospital	75	30	36
Bristol Royal Infirmary	30	27	31
University Hospital of Wales	57	31	28
Leeds General Infirmary	23	15	26
Royal Victoria Hospital	30	22	25
Nottingham City Hospital	38	36	24
Hammersmith Hospital	23	15	23
Queen Elizabeth Hospital	33	19	22
Freeman Hospital	21	27	21
Royal Sussex County Hospital	17	19	19
Glenfield Hospital	34	9	18
University Hospital Coventry	23	18	18
Basildon Hospital	10	6	15
Derriford Hospital	26	22	15
Manchester Royal Infirmary	34	10	12
Morriston Hospital	10	8	11
James Cook University Hospital	10	3	10
Spire Southampton Hospital (PP)	10	1	9
Castle Hill Hospital	10	7	9
St George's Hospital	23	14	9
Mater Misericordiae Hospital	14	15	8
University Hospital of North Staffordshire	9	4	4
Cromwell Hospital (PP)	0	1	1
Spire St Anthony's Hospital (PP)	1	0	0

Includes all tricuspid valve operations (with and without concomitant procedures). Ranked by numbers performed in 2021/22. PP private hospital.

Surgery of the Aorta – Trends and Outcomes

Major Aortic surgery (of any type) - cases per year (by nation)



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	1913	2141	2269	2414	2531	2670	2689	2188	2713
England	1731	1928	2061	2243	2319	2480	2498	2048	2551
Northern Ireland	61	65	60	62	62	54	67	33	63
Republic of Ireland	32	37	50	37	58	61	47	38	25
Wales	89	111	98	72	92	75	77	69	74

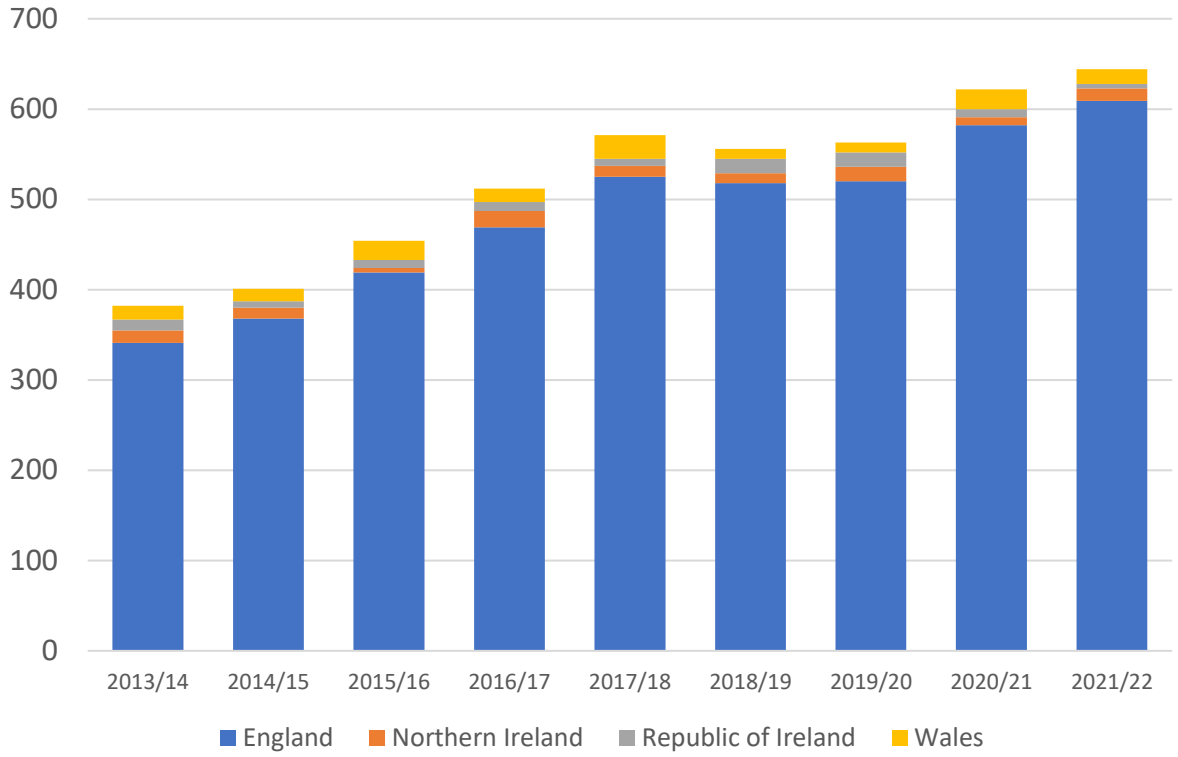
All operations involving a segment of the thoracic aorta with or without concomitant procedures (such as CABG etc). Includes all operative urgencies (elective and emergency etc).

Major Aortic surgery (of any type) - cases per year (by hospital)

Hospital	2019/20	2020/21	2021/22
Liverpool Heart and Chest Hospital	189	167	261
Barts and the London	174	185	260
Papworth Hospital	138	140	182
Bristol Royal Infirmary	132	130	149
Royal Brompton Hospital	85	76	126
Southampton General Hospital	141	86	122
St Thomas' Hospital	154	101	122
Harefield Hospital	113	116	94
Wythenshawe Hospital	53	54	92
Derriford Hospital	94	82	90
King's College Hospital	89	47	88
Glenfield Hospital	110	67	83
John Radcliffe Hospital	72	65	70
New Cross Hospital	62	47	69
Nottingham City Hospital	85	68	67
Royal Victoria Hospital	67	33	63
Leeds General Infirmary	46	61	59
Freeman Hospital	63	45	56
Northern General Hospital	82	88	56
University Hospital of North Staffordshire	61	53	55
Basildon Hospital	75	62	54
Royal Sussex County Hospital	40	34	53
Spire Southampton Hospital (PP)	15	8	52
Queen Elizabeth Hospital	101	59	51
Castle Hill Hospital	43	38	47
University Hospital of Wales	50	47	46
James Cook University Hospital	27	50	42
Blackpool Victoria Hospital	60	45	38
University Hospital Coventry	38	29	38
St George's Hospital	50	24	30
Morriston Hospital	27	22	28
Mater Misericordiae Hospital	47	38	25
Hammersmith Hospital	38	7	19
Manchester Royal Infirmary	58	12	14
Spire St Anthony's Hospital (PP)	9	1	9
Cromwell Hospital (PP)	1	1	3

All operations involving a segment of the thoracic aorta +/- concomitant procedures (such as CABG etc). Includes all operative urgencies (elective and emergency etc). Ranked by rates in 2021/22.

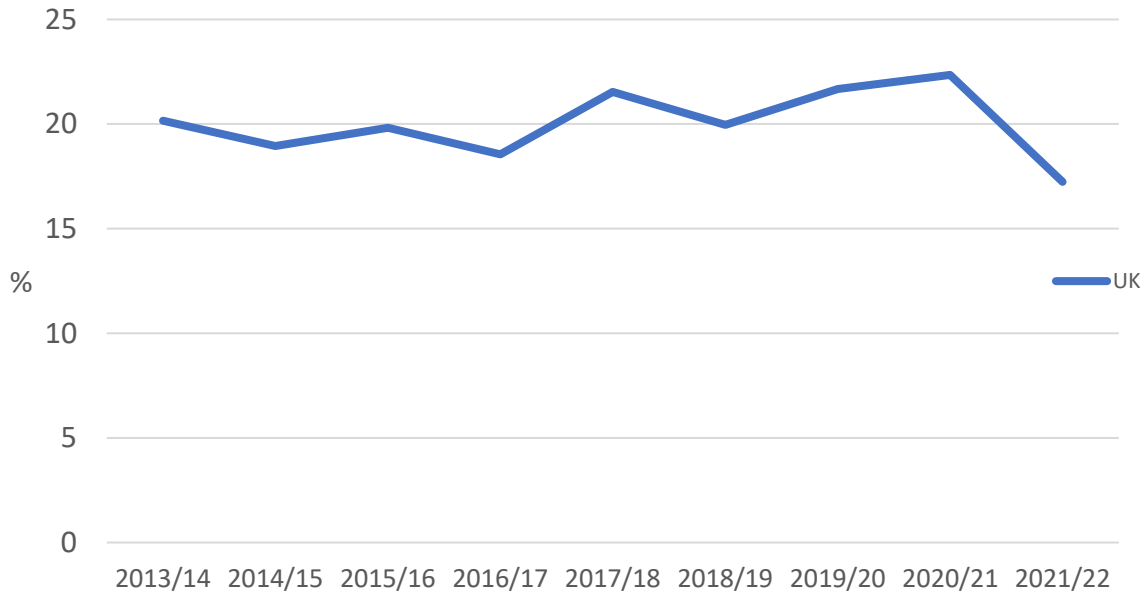
Emergency Aortic Surgery – cases per year (by nation)



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	382	401	454	512	571	556	563	622	644
England	341	368	419	469	525	518	520	582	609
Northern Ireland	14	12	5	18	12	11	16	9	14
Republic of Ireland	12	7	9	10	8	16	16	9	5
Wales	15	14	21	15	26	11	11	22	16

Any operation on a segment of the thoracic aorta performed as an emergency (includes both emergencies and salvage). The large majority (but not all) are for aortic dissection.

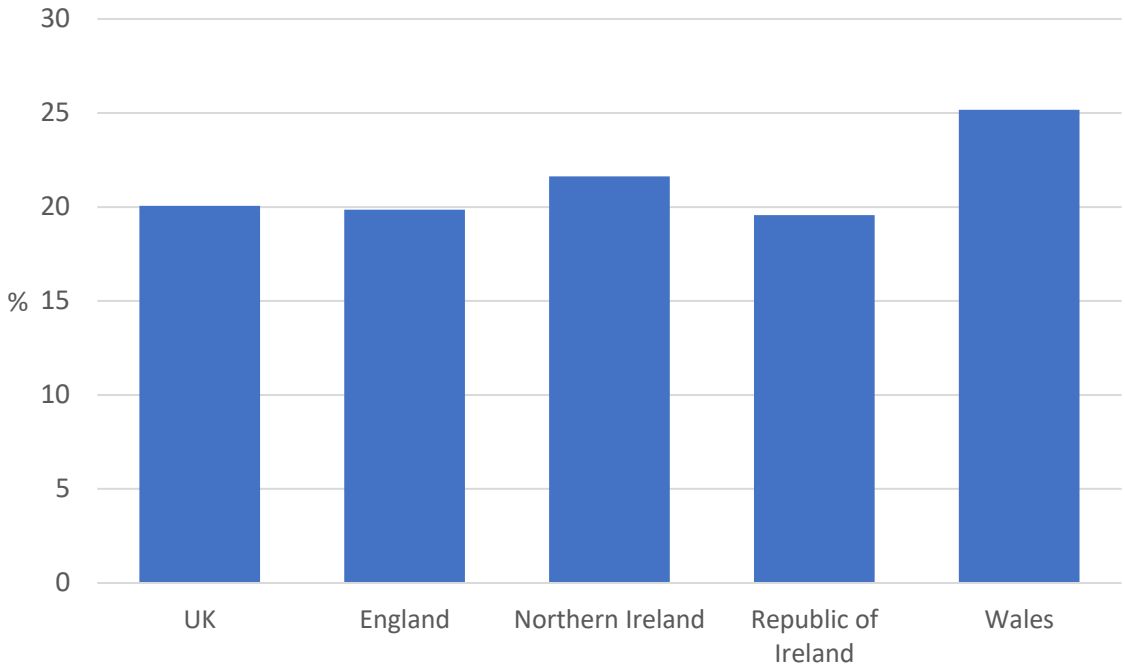
Mortality Rates (%) following Emergency Aortic Surgery – by year/nation



Nations	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	20.2	19.0	19.8	18.6	21.5	20.0	21.7	22.4	17.2
England	19.9	19.3	19.3	18.3	21.9	18.5	21.7	22.2	17.2
Northern Ireland	21.4	0	20.0	22.2	25.0	18.2	37.5	33.3	14.3
Republic of Ireland	8.3	14.3	11.1	10.0	37.5	56.3	6.3	0	20.0
Wales	33.3	28.6	33.3	26.7	7.7	36.4	18.2	31.8	18.8

Mortality rate (%) following emergency operations on the Thoracic Aorta. The large majority (but not all) are for aortic dissection.

Mean Mortality Rates (%) following Emergency Aortic Surgery between 2013/14 to 2021/22 – by nation



Nations	Cases (2013/14 to 2021/22)	Mortality (%)
UK (excluding Scotland)	4705	20.1
England	4351	19.9
Northern Ireland	111	21.6
Republic of Ireland	92	19.6
Wales	151	25.2

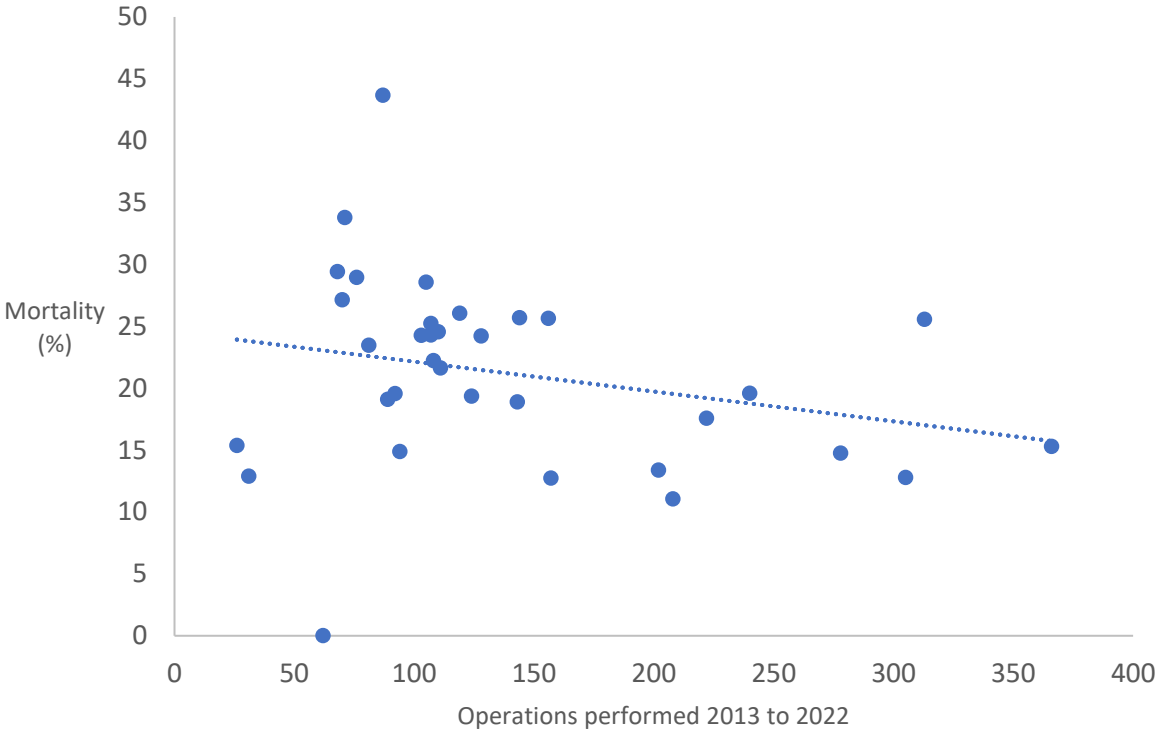
Total of emergency aortic surgery cases performed over the last nine financial years (2013/14 to 2021/22).

Emergency Aortic Surgery Cases and Mean Mortality Rates (%) between 2013/14 to 2021/22 – by hospital

Hospital	Cases (2013/14 to 2021.22)	Mortality (%)
Papworth Hospital	366	15.3
Barts and the London	313	25.6
Southampton General Hospital	305	12.8
Liverpool Heart and Chest Hospital	278	14.8
Bristol Royal Infirmary	240	19.6
St Thomas' Hospital	222	17.6
King's College Hospital	208	11.1
Derriford Hospital	202	13.4
John Radcliffe Hospital	157	12.7
Harefield Hospital	156	25.6
Glenfield Hospital	144	25.7
Nottingham City Hospital	143	18.9
Freeman Hospital	128	24.2
Royal Brompton Hospital	124	19.4
University Hospital of North Staffordshire	119	26.1
Royal Victoria Hospital	111	21.6
Royal Sussex County Hospital	110	24.6
Northern General Hospital	108	22.2
St George's Hospital	107	24.3
Queen Elizabeth Hospital	107	25.2
Basildon Hospital	105	28.6
Blackpool Victoria Hospital	103	24.3
New Cross Hospital	94	14.9
Mater Misericordiae Hospital	92	19.6
Leeds General Infirmary	89	19.1
Castle Hill Hospital	87	43.7
University Hospital of Wales	81	23.5
Manchester Royal Infirmary	76	29.0
University Hospital Coventry	71	33.8
Morriston Hospital	70	27.1
James Cook University Hospital	68	29.4
Wythenshawe Hospital	62	0
Hammersmith Hospital	31	12.9
University College Hospital	26	15.4

Total emergency aortic surgery cases for the last 9 financial years (2013/14 to 2021/22). Ranked by case rate.

Emergency Aortic Surgery – Scatter plot of Hospital Cases vs Mortality Rates (2013/14 to 2021/22)



Minimally Invasive Surgery

Incisions used for isolated AVR – UK (excluding Scotland)

	2019/20	2020/21	2021/22
Sternotomy	3332	2215	2868
Partial sternotomy	465	202	359
Thoracotomy	5	8	8
Mini thoracotomy	80	46	64
Other	10	14	14
Missing	740	307	197

Numbers of cases recorded. Multiple options allowed (so totals may not equal cases performed). Surgical incision was new data field in NACSA from April 2017. Data submission has improved each year.

Proportion (%) of isolated AVR via an incision other than a median sternotomy – by UK region and year

Nations	2019/20	2020/21	2021/22
UK	13.9	10.4	13.0
England	14.3	10.6	13.1
Northern Ireland	NA	NA	17.5
Wales	8.2	6.6	10.1

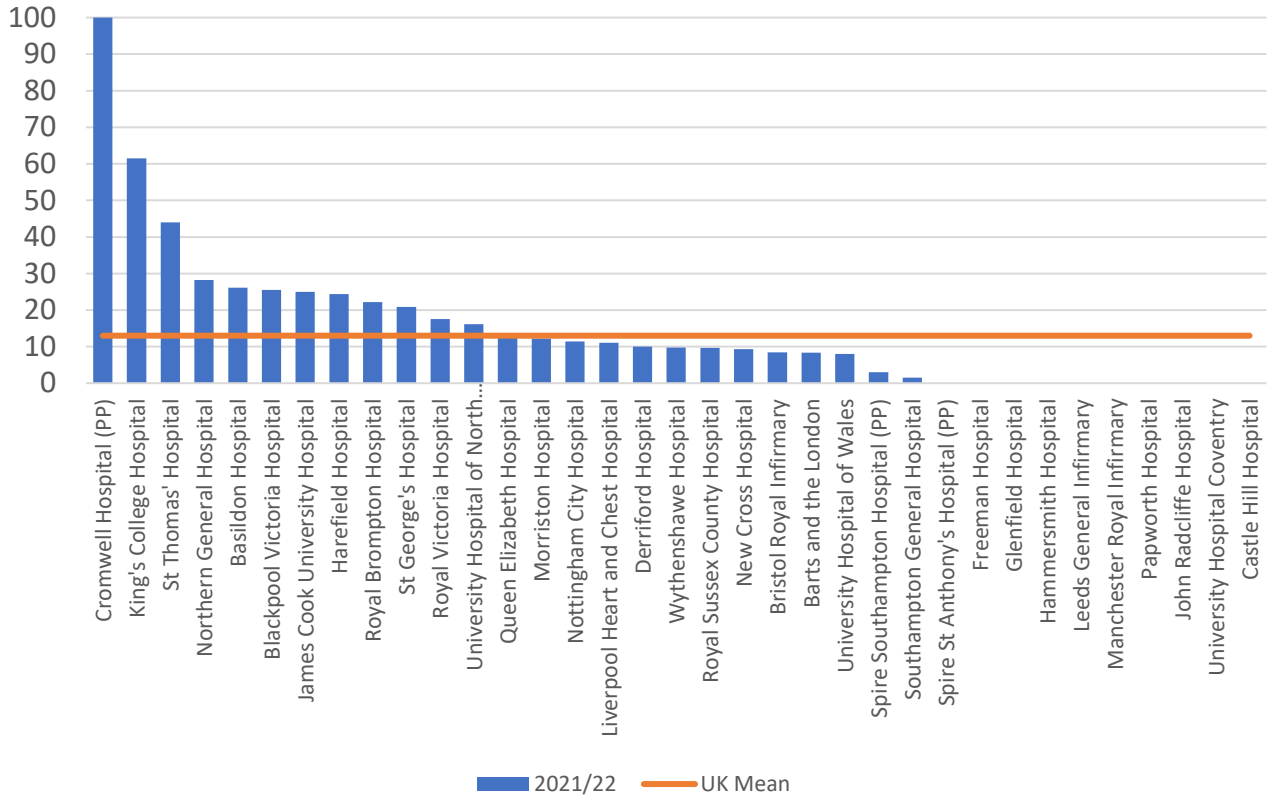
NA no data available.

Proportion (%) of isolated AVR operations via an incision other than median sternotomy – by hospital and year

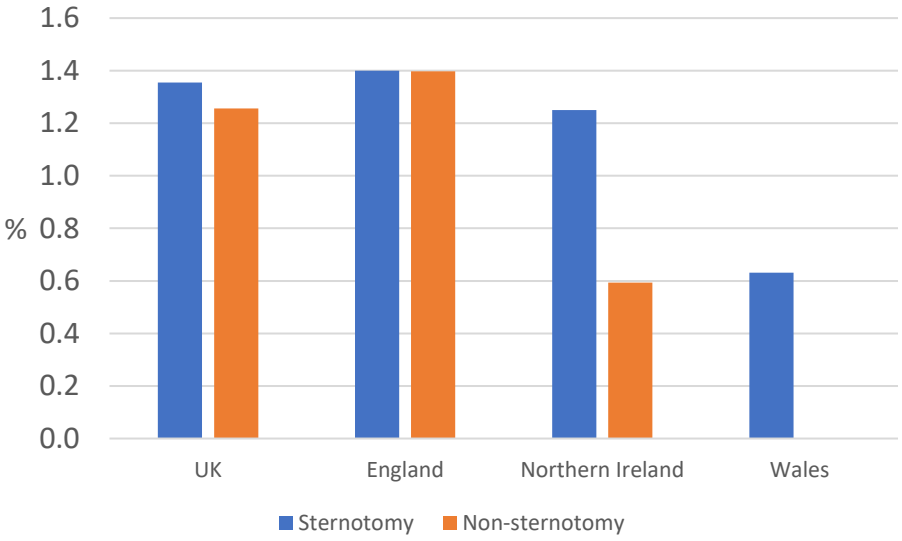
Hospital	Data missing 2021/22 (%)	2019/20	2020/21	2021/22
Cromwell Hospital (PP)		0	57	100
King's College Hospital	1.5	55	58	62
St Thomas' Hospital		38	37	44
Northern General Hospital	1.4	28	14	28
Basildon Hospital		17	21	26
Blackpool Victoria Hospital	4.9	23	18	26
James Cook University Hospital		23	11	25
Harefield Hospital		38	28	24
Royal Brompton Hospital		19	27	22
St George's Hospital		29	19	21
Royal Victoria Hospital	21.1	NA	NA	18
University Hospital of North Staffordshire	1.4	2	18	16
Queen Elizabeth Hospital		4	6	13
Morriston Hospital	1.2	6	11	12
Nottingham City Hospital		12	20	11
Liverpool Heart and Chest Hospital	2.5	11	13	11
Derriford Hospital	1.4	0	0	10
Wythenshawe Hospital	0.8	15	8	10
Royal Sussex County Hospital	1.6	0	10	10
New Cross Hospital	3.0	14	11	9
Bristol Royal Infirmary	2.4	18	9	8
Barts and the London		4	3	8
University Hospital of Wales	2.2	11	4	8
Spire Southampton Hospital (PP)	61.2	0	0	3
Southampton General Hospital		12	0	2
Spire St Anthony's Hospital (PP)		0	0	0
Freeman Hospital		2	0	0
Glenfield Hospital		6	0	0
Hammersmith Hospital	8.7	0	0	0
Leeds General Infirmary		NA	NA	0
Manchester Royal Infirmary	6.7	1	0	0
Papworth Hospital		8	0	0
John Radcliffe Hospital	1.2	0	0	0
University Hospital Coventry		0	0	0
Castle Hill Hospital	100	NA	NA	NA

PP private hospital. NA no data available. Ranked by highest 2021/22. Data missing is proportion of incision data not recorded for isolated AVR operations at each hospital in 2021/22 (blank if 0%).

Chart showing proportion (%) of isolated AVR operations not performed via a sternotomy - 2021/22.



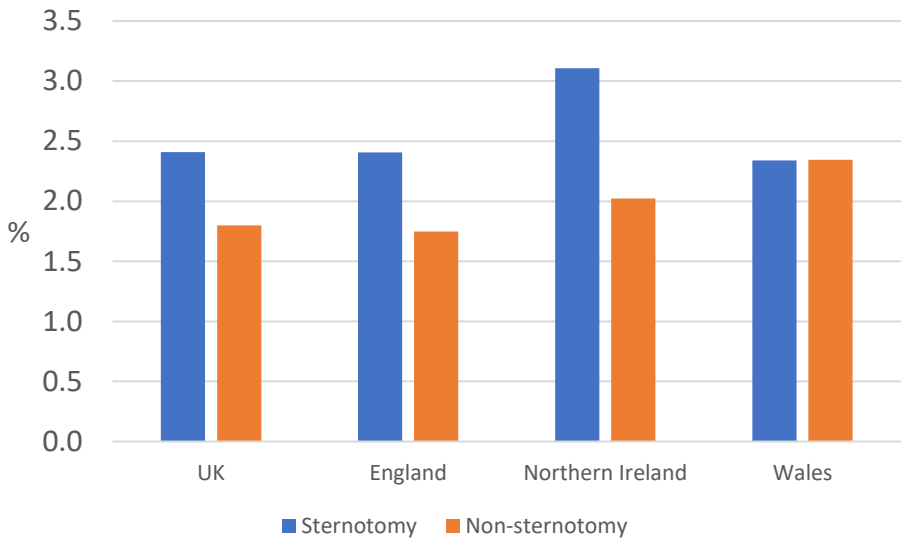
Crude Mortality (%) following isolated AVR - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nations	Sternotomy	Non-sternotomy
UK	1.35	1.26
England	1.40	1.40
Northern Ireland	1.25	0.59
Wales	0.63	

Includes emergencies. Aggregate data 2019/22

Mean EuroSCORE2 for isolated AVR - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nations	Sternotomy	Non-sternotomy
UK	2.41	1.80
England	2.41	1.75
Northern Ireland	3.11	2.02
Wales	2.34	2.35

Includes emergencies. Aggregate data 2019/22

Incisions used for isolated Mitral Valve Surgery – UK (excluding Scotland)

	2019/20	2020/21	2021/22
Sternotomy	1658	1117	1436
Partial sternotomy	29	5	0
Thoracotomy	32	20	29
Mini thoracotomy	226	159	180
Robot assisted	14	8	5
Other	17	1	17
Missing	334	130	84

Numbers of cases recorded. Multiple options allowed (so totals may not equal cases performed). Surgical incision was new data field in NACSA from April 2017. Data submission has improved each year.

Proportion (%) of isolated Mitral Valve operations via an incision other than a median sternotomy – by UK region and year

Nations	2019/20	2020/21	2021/22
UK	14.6	13.9	12.4
England	15.0	14.6	13.3
Northern Ireland	NA	NA	0
Wales	3.8	0	0

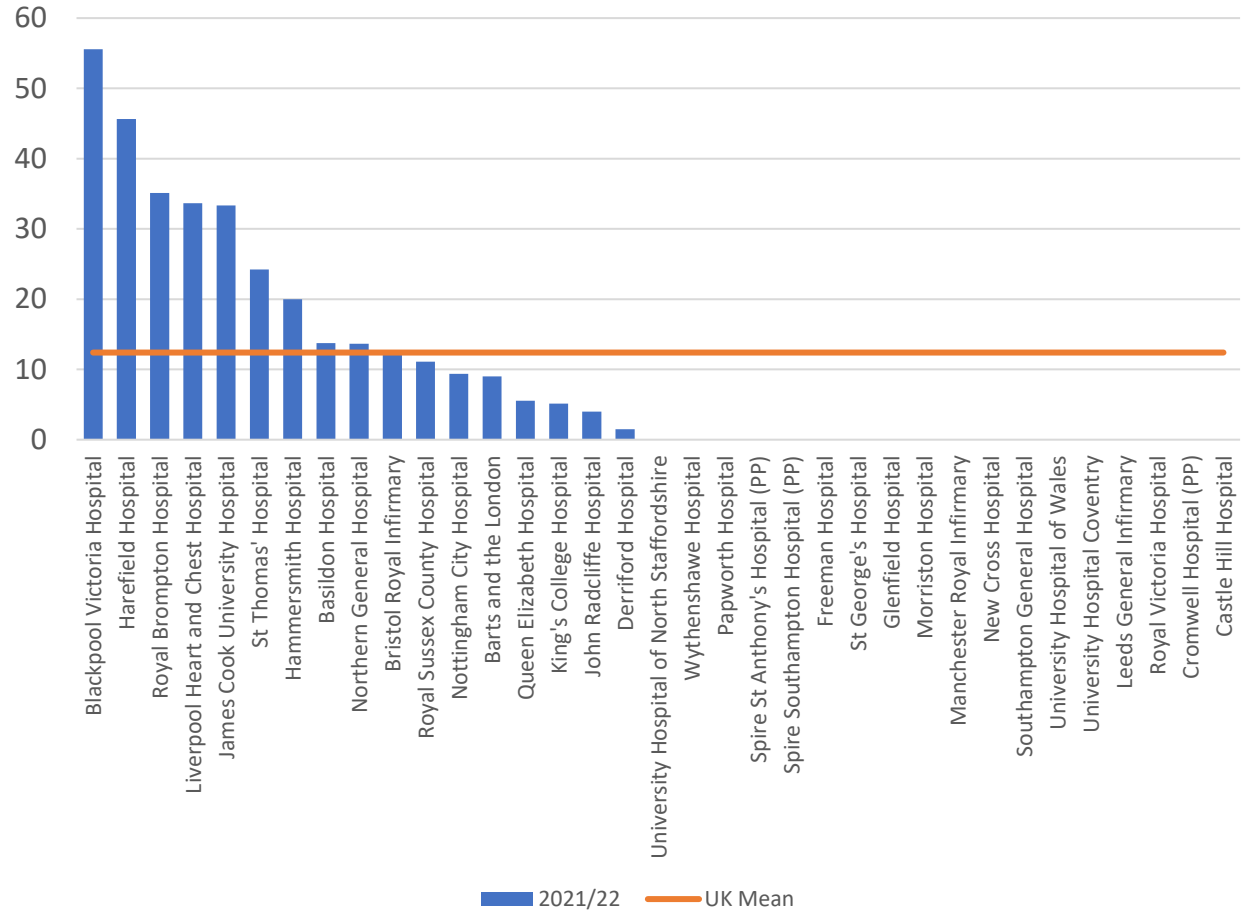
NA no data available

Proportion (%) of isolated Mitral valve operations via an incision other than median sternotomy – by hospital and year

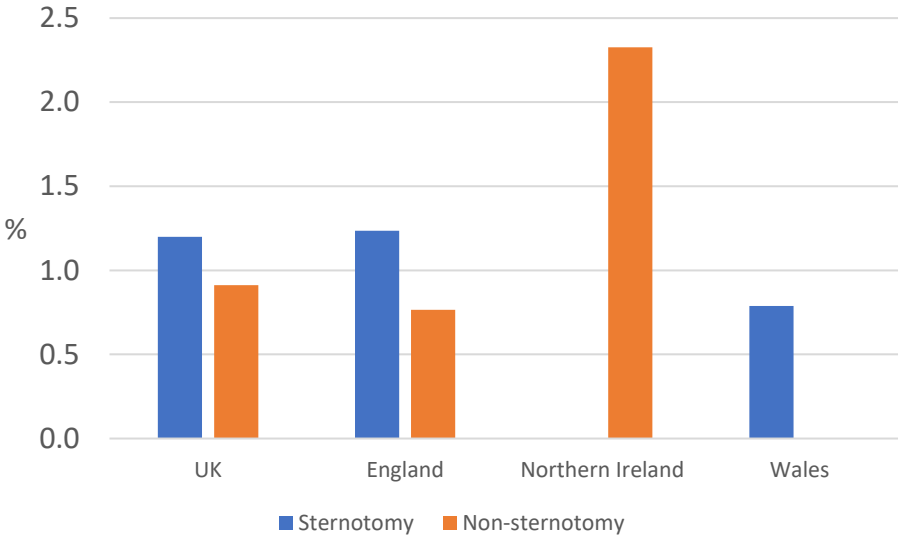
Hospital	Data missing 2021/22 (%)	2019/20	2020/21	2021/22
Blackpool Victoria Hospital	10.0	55	72	56
Harefield Hospital		39	30	46
Royal Brompton Hospital		4	28	35
Liverpool Heart and Chest Hospital		38	32	34
James Cook University Hospital		30	33	33
St Thomas' Hospital		25	26	24
Hammersmith Hospital		38	29	20
Basildon Hospital		11	19	14
Northern General Hospital		11	16	14
Bristol Royal Infirmary		14	12	12
Royal Sussex County Hospital		NA	26	11
Nottingham City Hospital		21	24	9
Barts and the London		0	0	9
Queen Elizabeth Hospital		2	0	6
King's College Hospital	26.4	6	0	5
John Radcliffe Hospital		0	0	4
Derriford Hospital	2.9	6	3	1
University Hospital of North Staffordshire		0	6	0
Wythenshawe Hospital	1.9	0	4	0
Papworth Hospital		17	4	0
Spire St Anthony's Hospital (PP)		0	0	0
Spire Southampton Hospital (PP)	46.0	0	0	0
Freeman Hospital	2.2	0	0	0
St George's Hospital		4	0	0
Glenfield Hospital		0	0	0
Morriston Hospital		0	0	0
Manchester Royal Infirmary	20.0	0	0	0
New Cross Hospital		1	0	0
Southampton General Hospital		0	0	0
University Hospital of Wales	7.9	6	0	0
University Hospital Coventry		0	0	0
Leeds General Infirmary		NA	NA	0
Royal Victoria Hospital	19.3	NA	NA	0
Cromwell Hospital (PP)		NA	0	NA
Castle Hill Hospital	100	0	NA	NA

PP private hospital. NA no data available. Ranked by highest 2021/22. Data missing is proportion of incision data not recorded for isolated Mitral operations at each hospital in 2021/22 (blank if 0%).

Chart showing proportion (%) of isolated Mitral Valve operations not performed via a sternotomy - 2021/22.



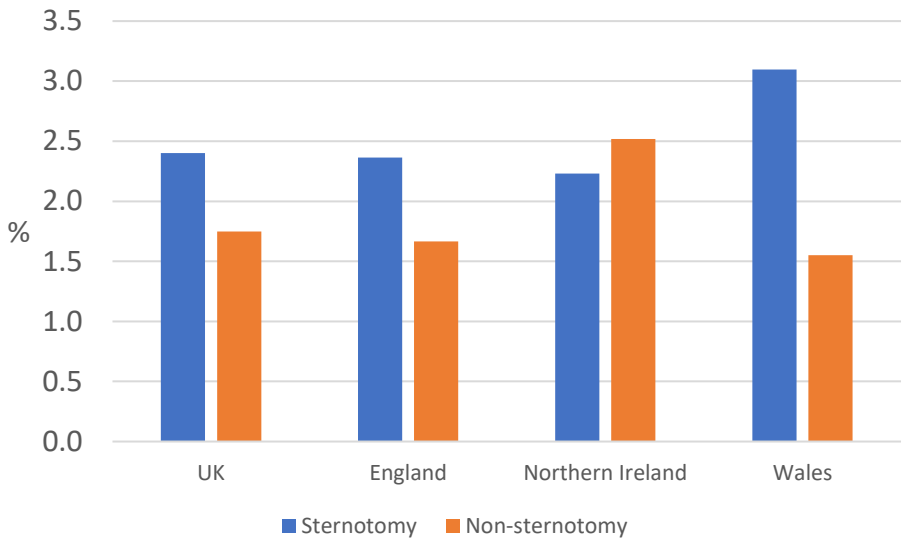
Crude Mortality (%) following isolated Mitral Valve operations - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nations	Sternotomy	Non-sternotomy
UK	1.20	0.91
England	1.24	0.77
Northern Ireland		2.33
Wales	0.79	

Includes emergencies. Aggregate data 2019/22

Mean EuroSCORE2 for isolated Mitral Valve operations - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nation	Sternotomy	Non-sternotomy
UK	2.40	1.75
England	2.37	1.67
Northern Ireland	2.23	2.52
Wales	3.10	1.55

Includes emergencies. Aggregate data 2019/22

Incisions used for isolated CABG – UK (excluding Scotland)

	2019/20	2020/21	2021/22
Sternotomy	11040	7531	10234
Partial sternotomy	15	2	0
Thoracotomy	6	2	4
Mini thoracotomy	147	115	209
Robotic assisted	23	27	23
Other	145	68	69
Missing	1760	768	495

Numbers of cases recorded. Multiple options allowed (so totals may not equal cases performed). Surgical incision was new data field in NACSA from April 2017. Data submission has improved each year.

Proportion (%) of isolated CABG operations via an incision other than a median sternotomy – by UK region and year

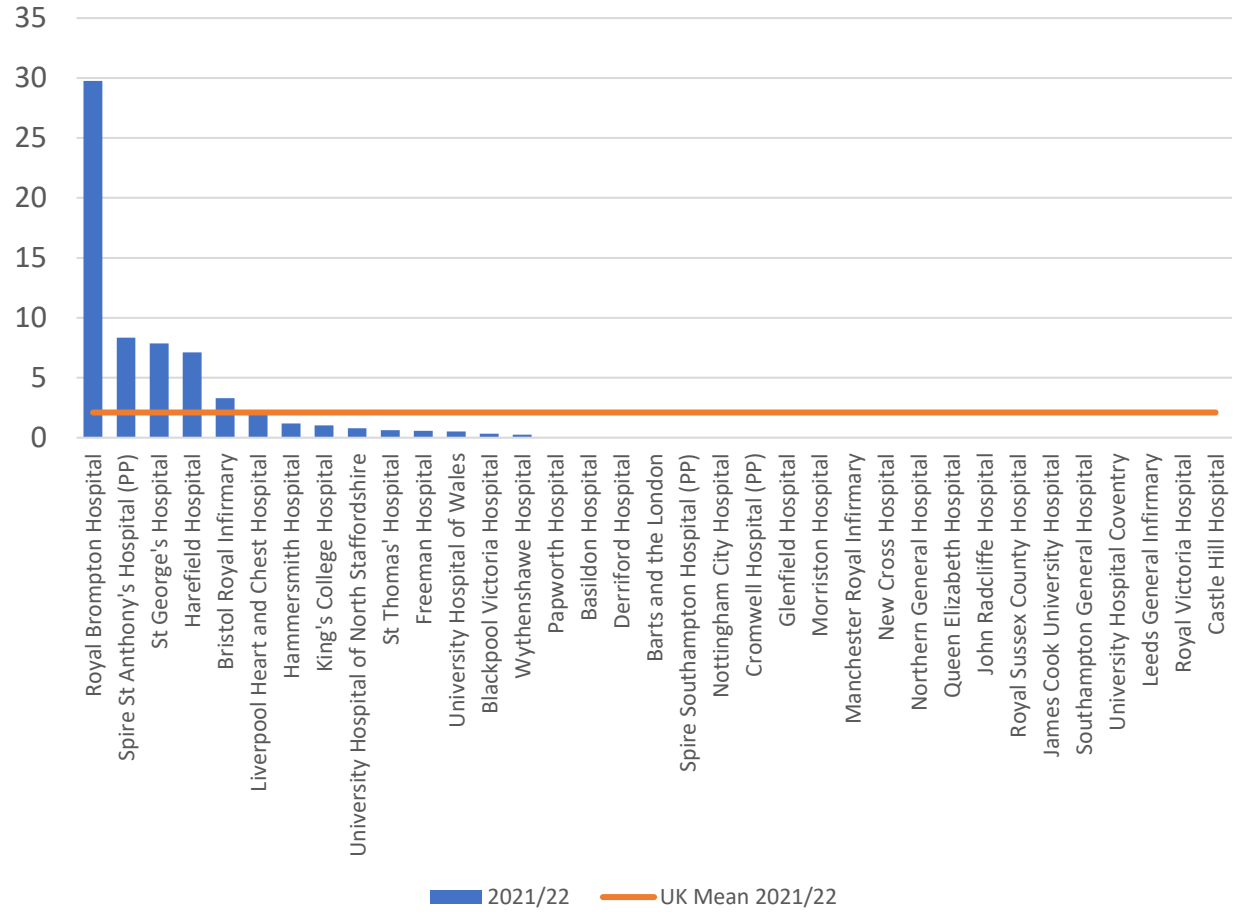
Nation	2019/20	2020/21	2021/22
UK	1.6	1.7	2.1
England	1.6	1.7	2.2
Northern Ireland	NA	NA	0
Wales	0	0	0.3

Proportion (%) of isolated CABG operations via an incision other than median sternotomy – by hospital and year

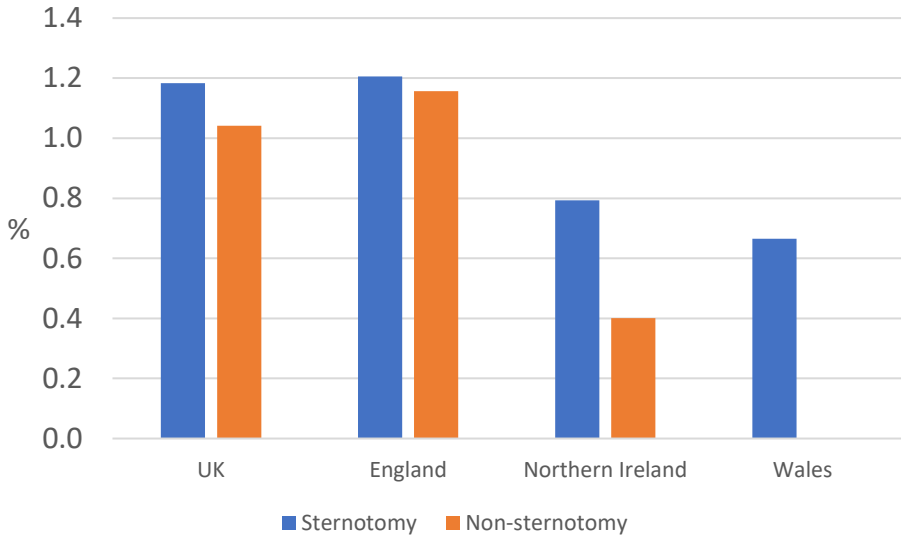
Hospital	Data missing 2021/22 (%)	2019/20	2020/21	2021/22
Royal Brompton Hospital		18.4	21.5	29.8
Spire St Anthony's Hospital (PP)		4.0	16.7	8.3
St George's Hospital		4.4	8.4	7.8
Harefield Hospital	0.4	6.7	5.7	7.1
Bristol Royal Infirmary	0.7	1.1	2.7	3.3
Liverpool Heart and Chest Hospital	2.1	1.8	1.6	2.1
Hammersmith Hospital	0.4	0.9	1.6	1.2
King's College Hospital	4.2	0.3	0.0	1.0
University Hospital of North Staffordshire	1.6	1.2	0.5	0.8
St Thomas' Hospital		0	0.5	0.6
Freeman Hospital		0	0	0.6
University Hospital of Wales	2.5	0	0	0.5
Blackpool Victoria Hospital	0.3	0.8	0.7	0.3
Wythenshawe Hospital	1.2	0	0	0.3
Papworth Hospital		2.1	0.5	0
Basildon Hospital		2.9	0.4	0
Derriford Hospital	0.7	0.7	0	0
Barts and the London		0.1	0	0
Spire Southampton Hospital (PP)	73.4	0	0	0
Nottingham City Hospital		0	0	0
Cromwell Hospital (PP)		0	0	0
Glenfield Hospital		0	0	0
Morriston Hospital	1.7	0	0	0
Manchester Royal Infirmary	9.5	0	0	0
New Cross Hospital	1.2	0	0	0
Northern General Hospital	1.5	0	0	0
Queen Elizabeth Hospital		0	0	0
John Radcliffe Hospital		0	0	0
Royal Sussex County Hospital	1.5	0	0	0
James Cook University Hospital		0	0	0
Southampton General Hospital		0	0	0
University Hospital Coventry		0	0	0
Leeds General Infirmary	0.4	NA	NA	0
Royal Victoria Hospital	21.3	NA	NA	0
Castle Hill Hospital	100	NA	NA	NA

PP private hospital. NA no data available. Ranked by highest 2021/22. Data missing is proportion of incision data not recorded for isolated CABG operations at each hospital in 2021/22 (blank if 0%).

Chart showing proportion (%) of isolated CABG operations not performed via a sternotomy - 2021/22.



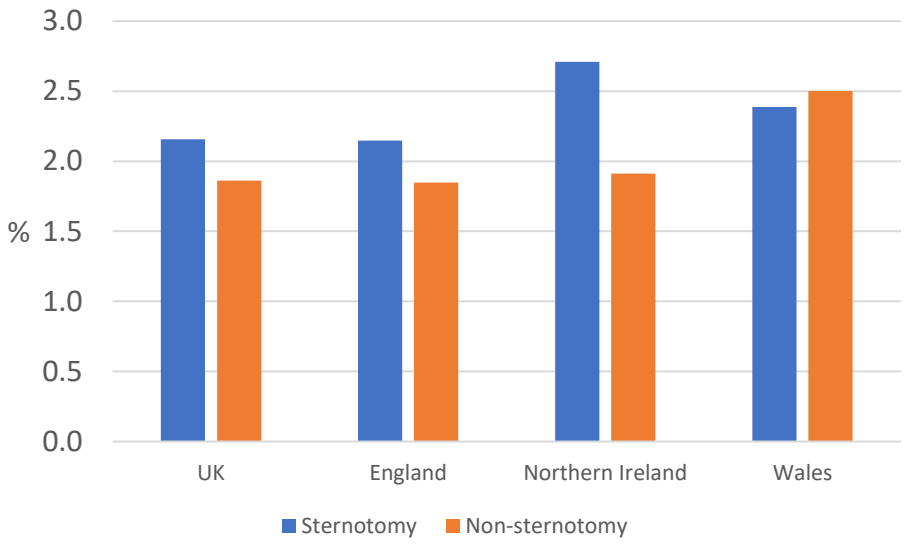
Crude Mortality (%) following isolated CABG - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nation	Sternotomy	Non-sternotomy
UK	1.18	1.04
England	1.21	1.16
Northern Ireland	0.79	0.40
Wales	0.67	

Includes emergencies. Aggregate data 2019/22

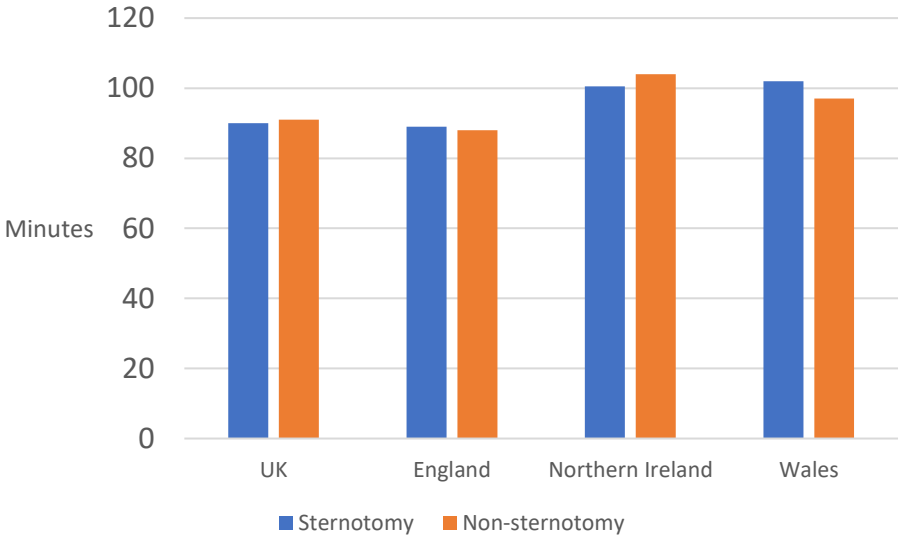
Mean EuroSCORE2 for isolated CABG - Sternotomy vs Non-sternotomy (aggregate data 2019/22)



Nation	Sternotomy	Non-sternotomy
UK	2.16	1.86
England	2.15	1.85
Northern Ireland	2.71	1.91
Wales	2.39	2.50

Includes emergencies. Aggregate data 2019/22

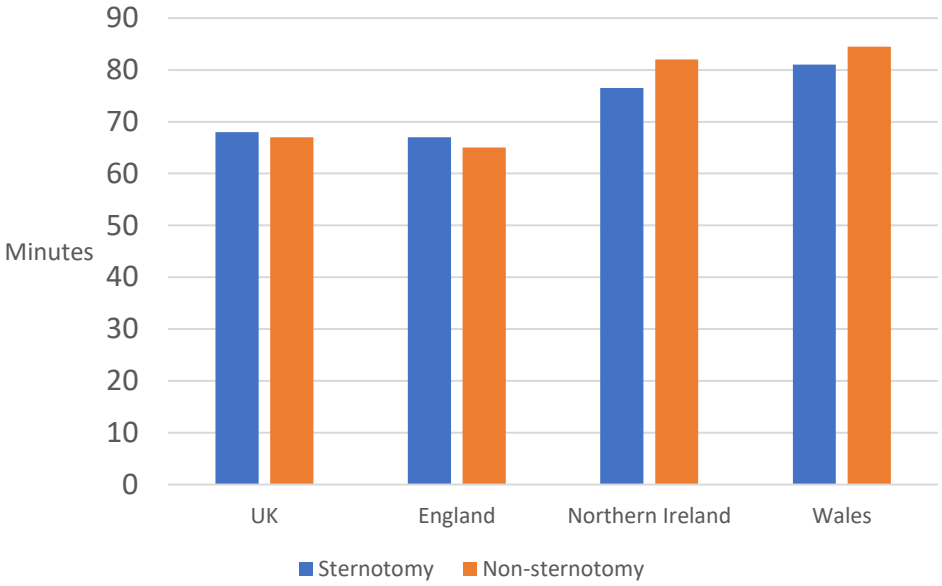
Comparison of Bypass times (mean) for isolated AVR – conventional sternotomy vs non-sternotomy incisions – by UK and nation



Nation	Sternotomy	Non-sternotomy
UK	90	91
England	89	88
Northern Ireland	100.5	104
Wales	102	97

Mean Bypass time (minutes). Aggregate data for three years (2019/22). Non-sternotomy includes all operations performed by a route other than a conventional full sternotomy. For options see section of report on incision types.

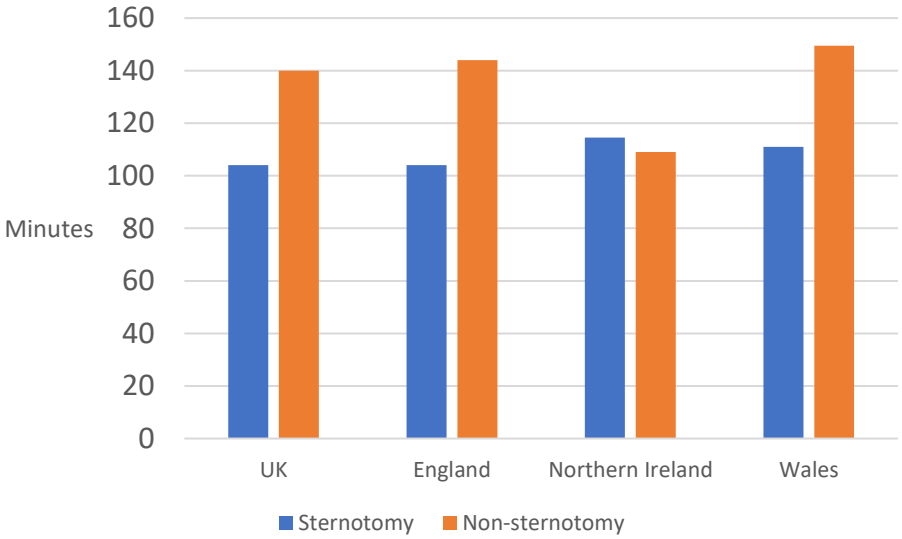
Comparison of Crossclamp times (mean) for isolated AVR – conventional sternotomy vs non-sternotomy – by UK and nation



Nation	Sternotomy	Non-sternotomy
UK	68	67
England	67	65
Northern Ireland	76.5	82
Wales	81	84.5

Mean Crossclamp time (minutes). Aggregate data for three years (2019/22). Non-sternotomy includes all operations performed by a route other than a conventional full sternotomy.

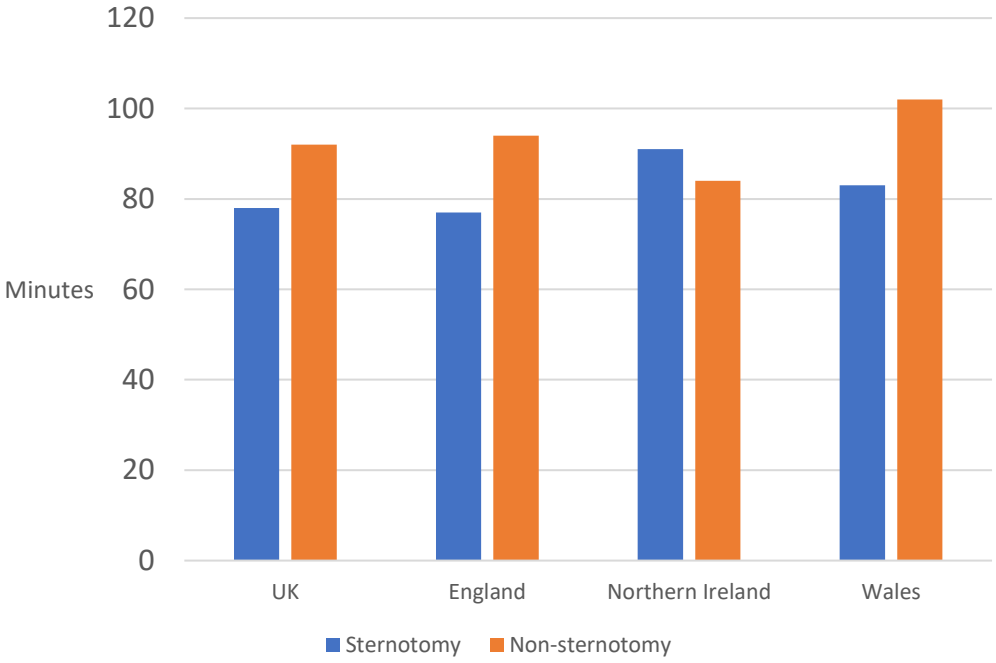
Comparison of Bypass times (mean) for isolated Mitral valve operations – conventional sternotomy vs non-sternotomy – by UK and nation



Nation	Sternotomy	Non-sternotomy
UK	104	140
England	104	144
Northern Ireland	114.5	109
Wales	111	149.5

Mean Bypass time (minutes). Aggregate data for three years (2019/22). Non-sternotomy includes all operations performed by a route other than a conventional full sternotomy. For options see section of report on incision types.

Comparison of Crossclamp times (mean) for isolated Mitral valve operations – conventional sternotomy vs non-sternotomy – by UK and nation



Nation	Sternotomy	Non-sternotomy
UK	78	92
England	77	94
Northern Ireland	91	84
Wales	83	102

Mean Crossclamp time (minutes). Aggregate data for three years (2019/22). Non-sternotomy includes all operations performed by a route other than a conventional full sternotomy.

Outcomes – Hospital Survival Rates after Cardiac Surgery (COP)

Explanation of Outlier analysis/Forest plots

Outlier methodology for Clinical Outcomes Publication (COP)

A random effects (RE) methodology is used to infer the outlier status of each hospital. Further technical details are available from NICOR.[1] The results are displayed graphically using a forest plot.

Forest plot

Vertical axis: Hospital identifier code and in parentheses: number of procedures performed and completeness of survival data (i.e. the percentage of patients for whom survival data are available).

Horizontal axis: Percentage Survival whilst in hospital for operation (Overall for UK; and Observed, Predicted, model-based Risk-Adjusted for each hospital).

More specifically, the following quantities are presented:

1. Overall UK In-Hospital Survival [dashed vertical line]: the overall proportion of patients who survive across all hospitals in the UK. In the attached graphs it is around 98.2% for All Cardiac surgery and 99.0% for Isolated CABG.

2. Observed Survival per hospital [square]: The proportion of patients who survived after surgery in each hospital. (Data are presented for All Cardiac operations and for Isolated CABG operations).

3. Predicted Survival per hospital [cross]: The Predicted Survival, using the modified EuroSCORE logistic mortality model to account for case-mix. For example, a high predicted survival (relative to the overall UK survival) suggests that the hospital performs surgery on relatively low-risk patients.

4. Survival probability (RE model) for outlier detection [full circle]: Survival for each hospital, derived from a random effects model after accounting for case-mix. This estimate and the corresponding horizontal bar provide an indication of whether the hospital is an 'outlier' after taking into account observed and predicted survival.

Quantities 1 and 2 do not require any statistical modelling. Calculation of the Quantities 3 and 4 require the application of the modified EuroSCORE logistic mortality model to predict the outcome and of a random effects model for the detection of outliers.

Display of outliers

Hospitals with outcomes within limits of acceptable variability are assumed to demonstrate 'usual' or 'normal performance'. A hospital is said to be an outlier when its performance deviates from usual, normal performance.

Black full circles indicate hospitals with normal performance (performance 'within expected limits').

Red or Green full circles indicate hospitals with worse (red) or better (green) performance than normal at the 3SD level. A hospital with lower risk-adjusted survival than usual at the 3SD level is called an *'Alarm'.*

For the purposes of public reporting only 3SD outliers are displayed on the published forest plots (2SD outliers are notified by SCTS and NICOR, but their results are not displayed).

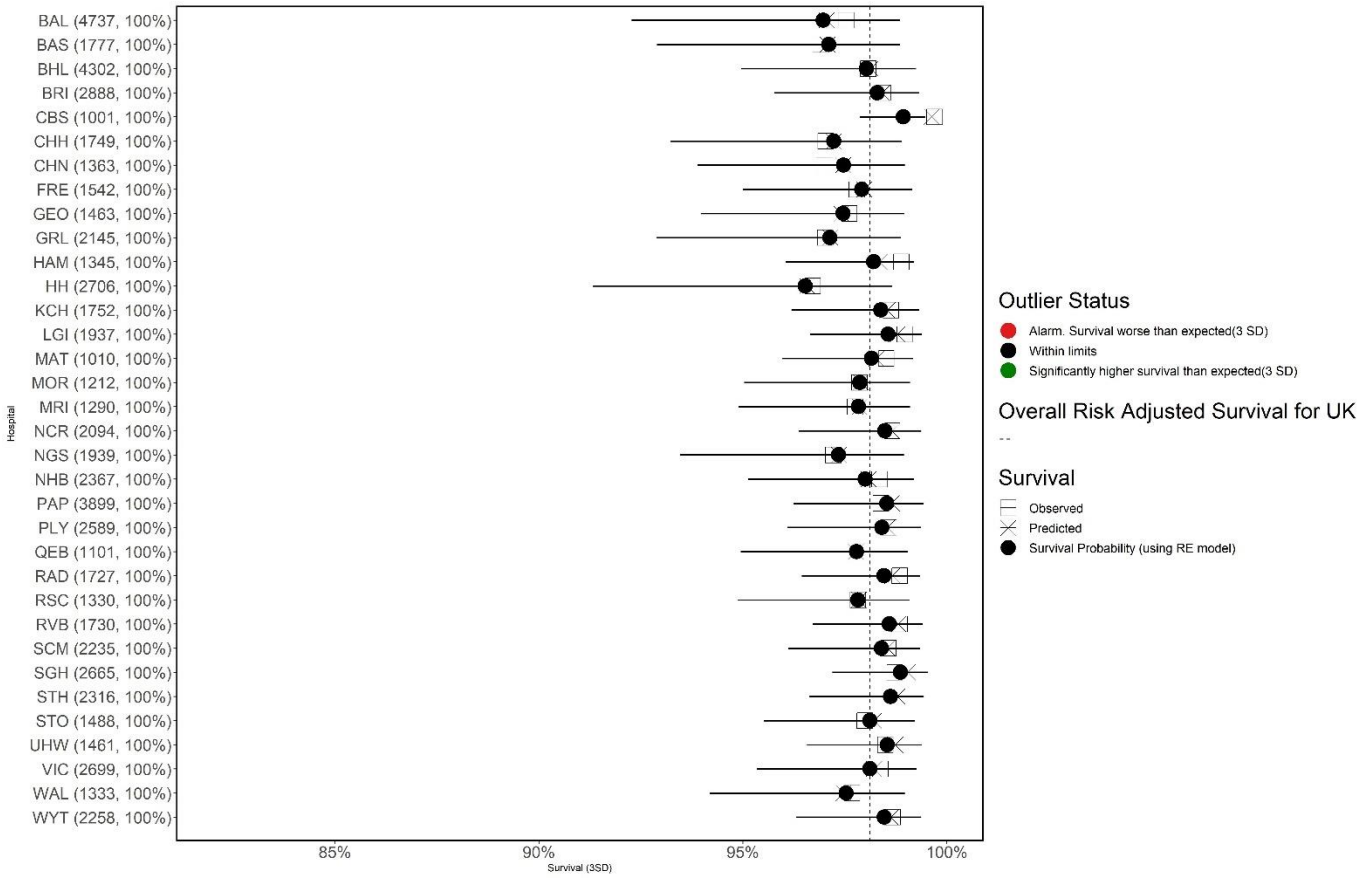
The confidence intervals for the Survival probability (RE model) for outlier detection (solid horizontal bars) indicate whether a hospital is a potential outlier at a given significance level:

- If the confidence interval for a hospital crosses the vertical Overall Survival dashed line, then the performance of that hospital does not deviate from normal performance.
- If the confidence interval fails to cross the vertical Overall UK Survival dashed line, then the hospital is either performing significantly better (Green), or significantly worse (Red) than normal. Such hospitals are potential outliers at the 3 SD level.
- The length of each confidence interval relates to the estimate of the Survival probability (RE model) for each hospital, after accounting for case-mix, relative to the variation in survival across all UK hospitals. The confidence intervals are not symmetric due to the inverse log-odds transformation. The length of the confidence interval shortens as survival approaches 100%.

Note: The validity of the outlier process relies on having an adequate number of patients per hospital. Although there is no exact guideline for this figure, simulation studies suggest that for the settings considered (survival of 98%) the minimum number of observations to ensure the validity of the tests is 200. Thus, hospitals with fewer than 200 patients will not have horizontal bars placed around their survival estimate and will not be assigned an outlier status.

A more detailed explanation of the methodology used is available via this link https://rdcu.be/c29Lo

Risk Adjusted Survival after All Adult Cardiac Surgery - UK Hospital Level Forest Plot (3 years 1/4/2019 to 31/3/2022)

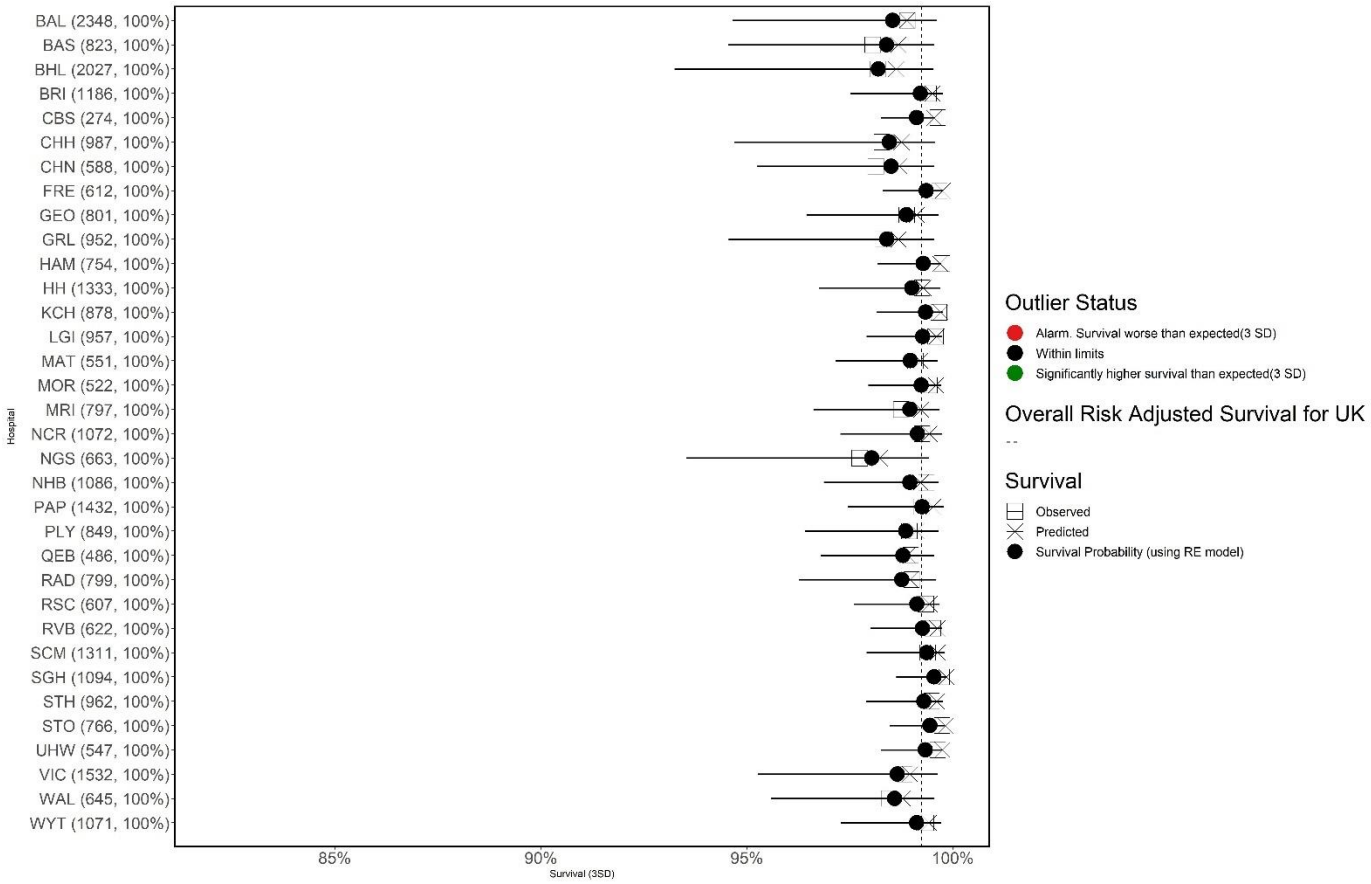


For **Hospital Codes** see Appendix.

For the three years (2019/22) there were no hospitals that were 3SD positive or negative “Alarm” outliers in the UK. Every hospital has survival rates for all cardiac surgery in this period that was “as expected”.

The UK survival rate following All Cardiac surgery was 98.11% for this period. This analysis excludes emergency work as well as a small group of pre-determined uncommon or very high-risk procedures.

Risk Adjusted Survival after Isolated CABG Surgery - UK Hospital Level Forest Plot (3 years 1/4/2019 to 31/3/2022)



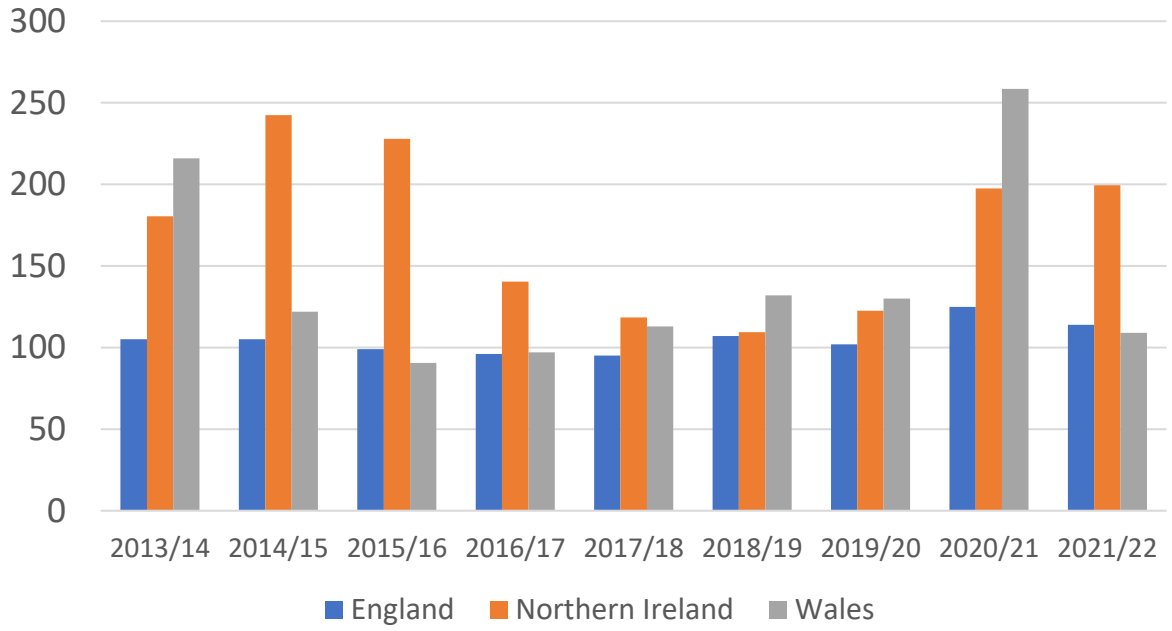
For **Hospital Codes** see Appendix.

For the three years (2019/22) there were no hospitals that were 3SD positive or negative “Alarm” outliers in the UK. Every hospital has survival rates for isolated CABG surgery in this period that was “as expected”.

The UK survival rate following isolated CABG surgery was 99.05% for this period.

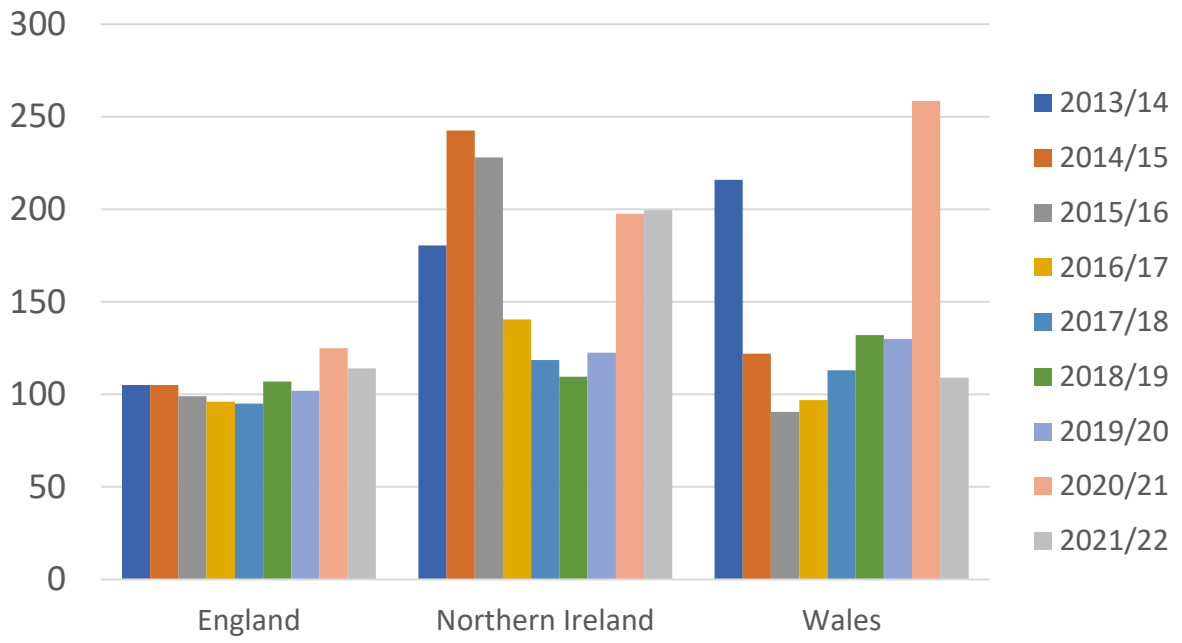
Non-mortality Performance and Outcome Metrics

Elective CABG waiting time – from angio to op date (mean days)

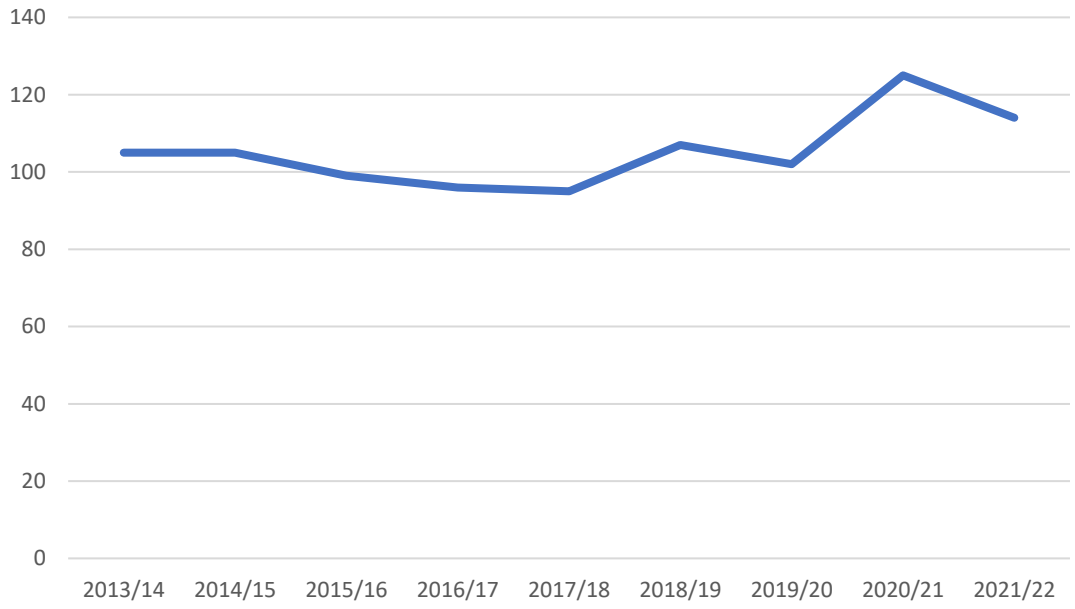


Nation	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
England	105	105	99	96	95	107	102	125	114
Northern Ireland	180.5	242.5	228	140.5	118.5	109.5	122.5	197.5	199.5
Wales	216	122	90.5	97	113	132	130	258.5	109

Days (mean) from angio to operation date



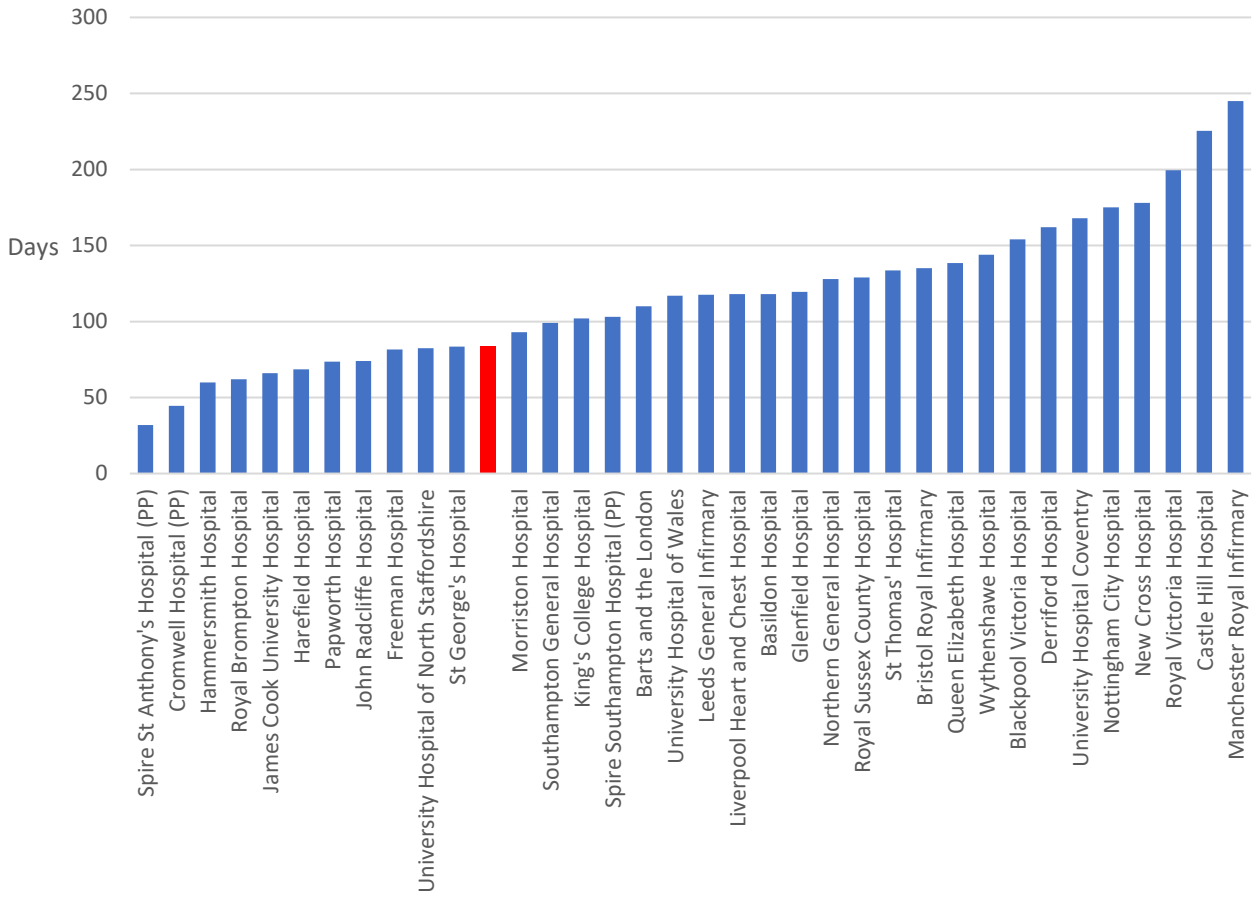
Days (mean) from angio to operation date – elective CABG



Waiting time (days from angio to op date) for elective CABG in England since 2013.

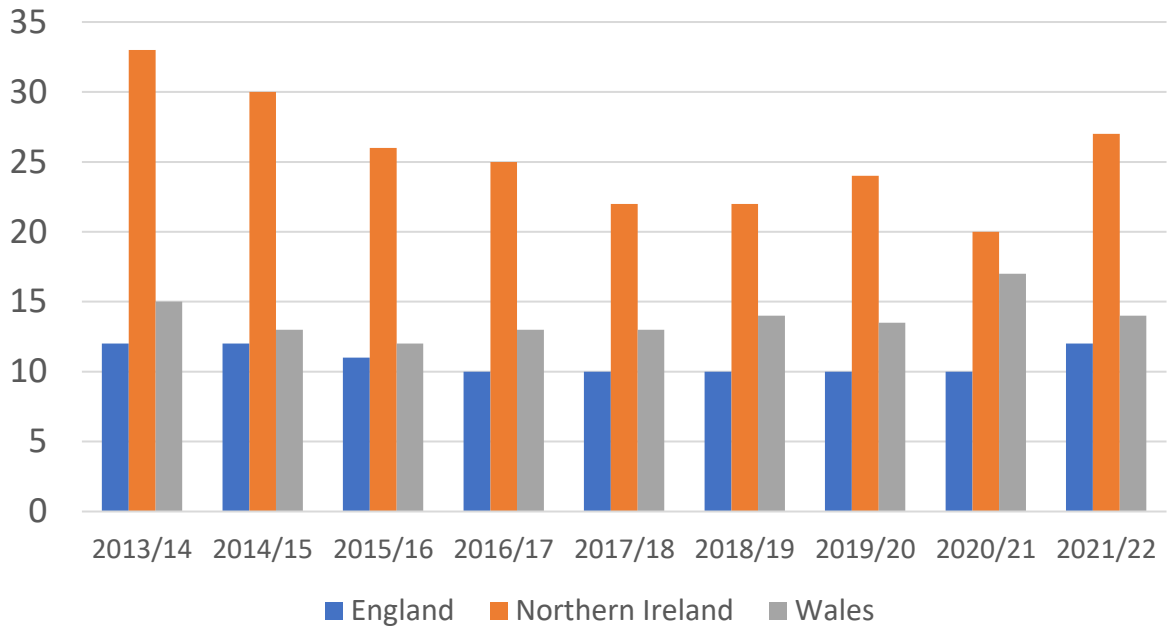
Hospital	2019/20	2020/21	2021/22
Spire St Anthony's Hospital (PP)	15	82	32
Cromwell Hospital (PP)	22	19.5	44.5
Hammersmith Hospital	86	78	60
Royal Brompton Hospital	66.5	90.5	62
James Cook University Hospital	72	101.5	66
Harefield Hospital	77.5	64	68.5
Papworth Hospital	133	98	73.5
John Radcliffe Hospital	104	125.5	74
Freeman Hospital	NA	54	81.5
University Hospital of North Staffordshire	84.5	98	82.5
St George's Hospital	79	88	83.5
Morriston Hospital	120	197	93
Southampton General Hospital	35	73	99
King's College Hospital	99	36.5	102
Spire Southampton Hospital (PP)	62.5	118	103
Barts and the London	88.5	119	110
University Hospital of Wales	150	271	117
Leeds General Infirmary	123	174	117.5
Liverpool Heart and Chest Hospital	78	135	118
Basildon Hospital	122	201	118
Glenfield Hospital	100	136.5	119.5
Northern General Hospital	126	108	128
Royal Sussex County Hospital	NA	159.5	129
St Thomas' Hospital	111	97	133.5
Bristol Royal Infirmary	98	168.5	135
Queen Elizabeth Hospital	182	229	138.5
Wythenshawe Hospital	109	154	144
Blackpool Victoria Hospital	117	120	154
Derriford Hospital	132	196.5	162
University Hospital Coventry	99	145	168
Nottingham City Hospital	138	112	175
New Cross Hospital	74	133	178
Royal Victoria Hospital	122.5	197.5	199.5
Castle Hill Hospital	130	187	225.5
Manchester Royal Infirmary	150	105	245

Standard is <12 week/84 days from angio to operation. Ranked by shortest elective wait time (days) for elective CABG in 2021/22. NA no data available. PP private hospital. Green if <84 days, red if >18 weeks.



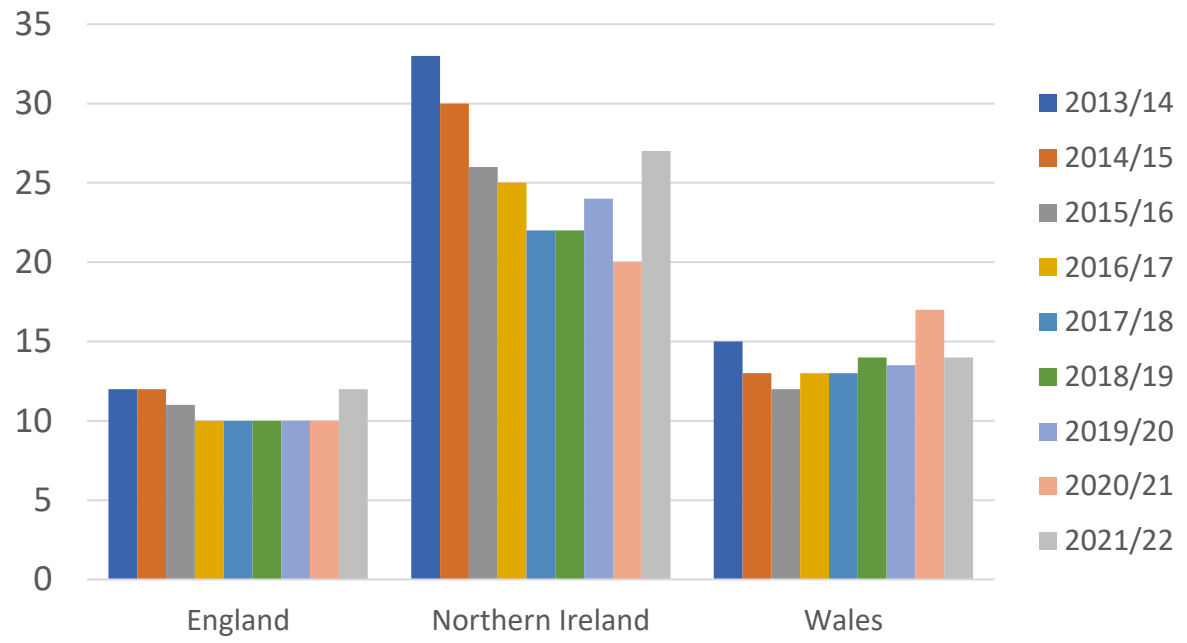
Elective waiting target is <84 days (from angio to operation). Hospitals to left of red bar achieved the target in 2021/22. Ranked by waiting time (days) 2021/22.

Urgent (inpatient) CABG waiting time – from angio to op date (mean days)



Nation	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
England	12	12	11	10	10	10	10	10	12
Northern Ireland	33	30	26	25	22	22	24	20	27
Wales	15	13	12	13	13	14	13.5	17	14

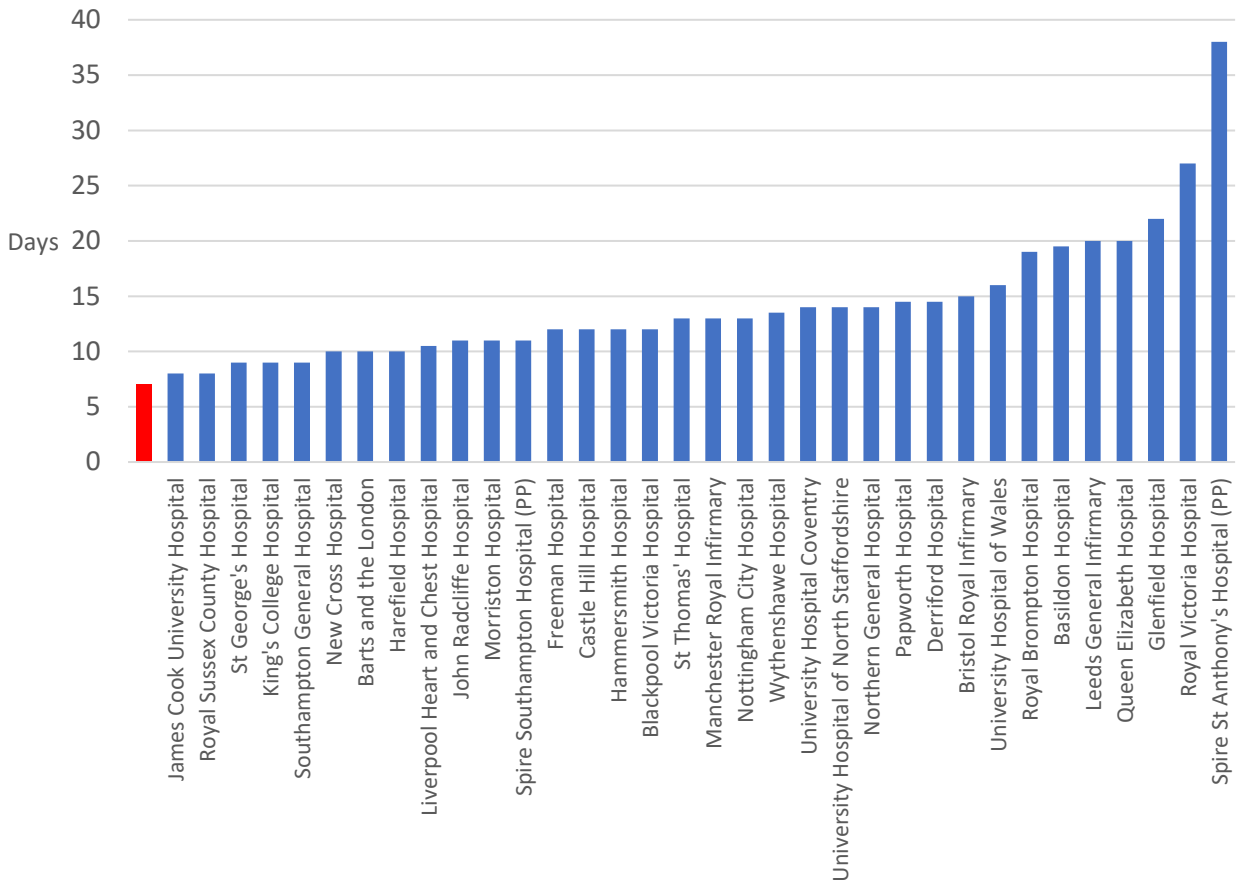
Days (mean) from angio to operation date



Days (mean) from angio to operation date – urgent CABG

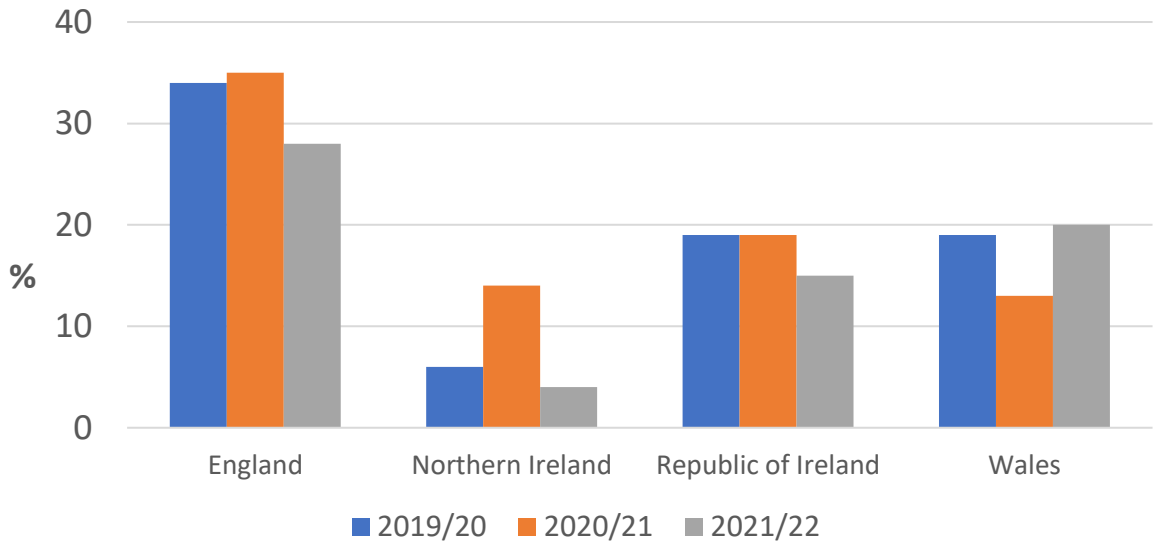
Hospital	2019/20	2020/21	2021/22
James Cook University Hospital	8	8	8
Royal Sussex County Hospital	NA	11	8
St George's Hospital	7	6	9
King's College Hospital	8	9	9
Southampton General Hospital	10	10	9
New Cross Hospital	7	8	10
Barts and the London	8	8	10
Harefield Hospital	9	11	10
Liverpool Heart and Chest Hospital	8	10	10.5
John Radcliffe Hospital	10	8	11
Morriston Hospital	12	16	11
Spire Southampton Hospital (PP)	11	NA	11
Freeman Hospital	2	7	12
Castle Hill Hospital	11	9	12
Hammersmith Hospital	12	9	12
Blackpool Victoria Hospital	12	12	12
St Thomas' Hospital	10	8	13
Manchester Royal Infirmary	10	9	13
Nottingham City Hospital	14	11	13
Wythenshawe Hospital	13	13.5	13.5
University Hospital Coventry	7	6.5	14
University Hospital of North Staffordshire	7	9	14
Northern General Hospital	15	14.5	14
Papworth Hospital	10	10	14.5
Derriford Hospital	13	12	14.5
Bristol Royal Infirmary	9	11	15
University Hospital of Wales	14	21	16
Royal Brompton Hospital	11	16	19
Basildon Hospital	14	12	19.5
Leeds General Infirmary	14	14	20
Queen Elizabeth Hospital	17	19	20
Glenfield Hospital	11.5	11	22
Royal Victoria Hospital	24	20	27
Spire St Anthony's Hospital (PP)	8	24	38
Cromwell Hospital (PP)	22	10	NA

Ranked by mean waiting time (from angio to operation) for Urgent CABG in 2021/22. Target is <7 days. PP private hospital. NA data not available. Green if achieve target. Red if worse than UK mean in 2021/22 of 12 days.



Mean waiting time (from angio to operation) for Urgent CABG in 2021/22. Target is <7 days (red bar). No hospital met this target.

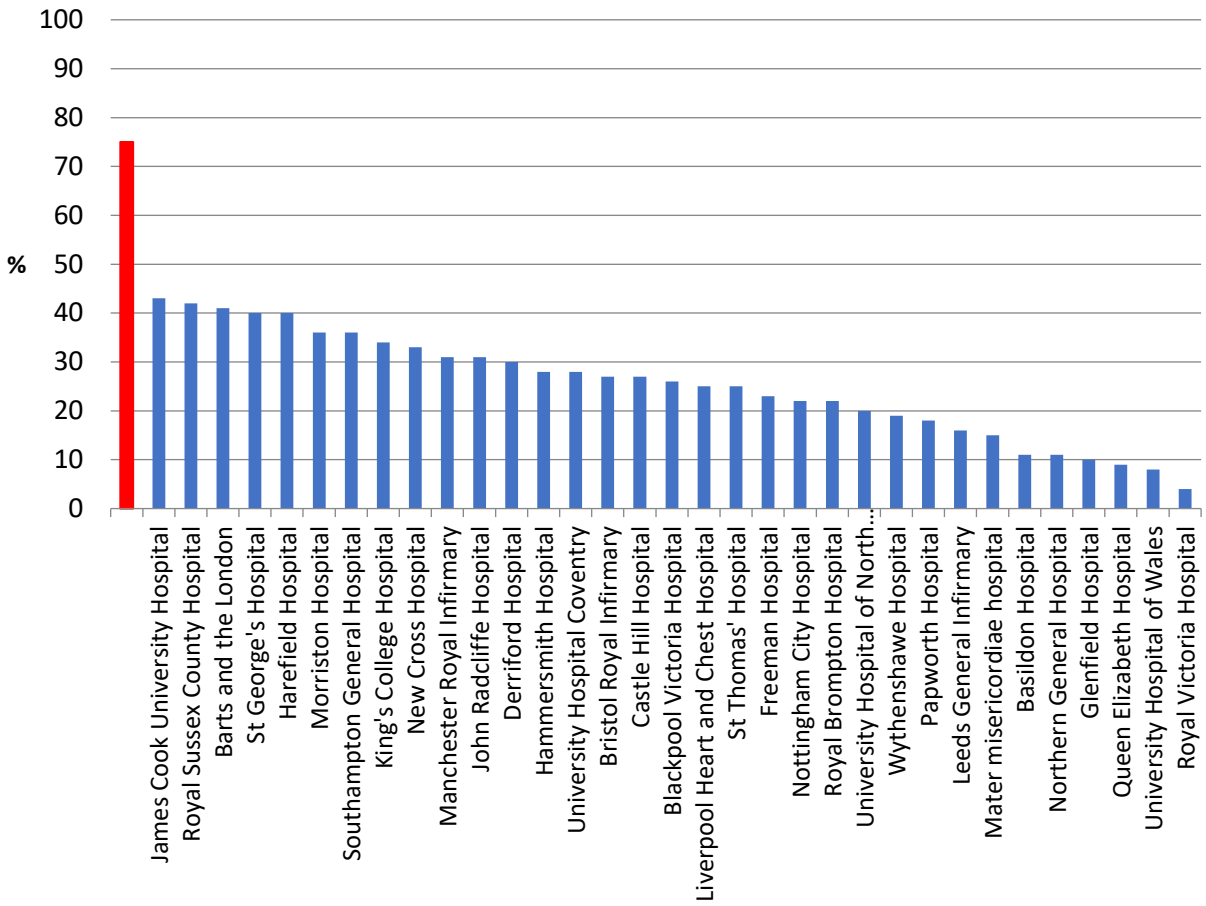
Proportion (%) of Urgent (IHU) CABG performed with 7 days of angiogram



Nation	2019/20	2020/21	2021/22
England	34	35	28
Northern Ireland	6	14	4
Republic of Ireland	19	19	15
Wales	19	13	20

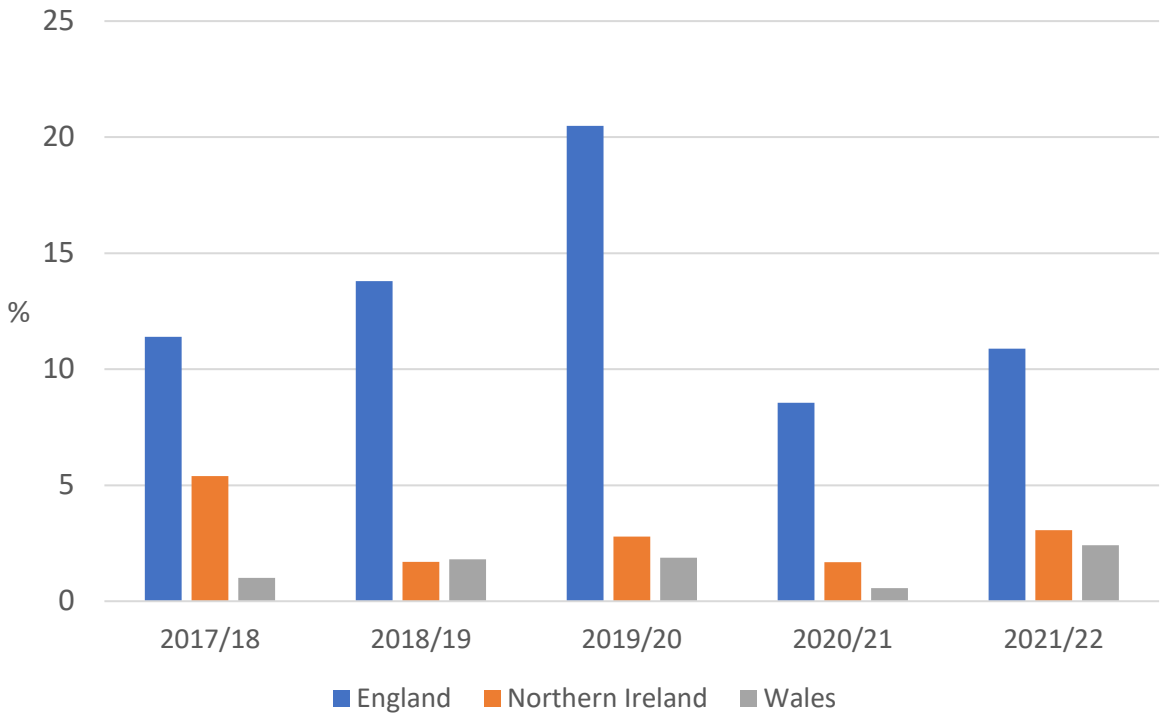
Hospital	2019/20	2020/21	2021/22
James Cook University Hospital	46	44	43
Royal Sussex County Hospital	NA	31	42
Barts and the London	50	48	41
St George's Hospital	57	58	40
Harefield Hospital	41	34	40
Morriston Hospital	26	17	36
Southampton General Hospital	34	39	36
King's College Hospital	42	33	34
New Cross Hospital	54	49	33
Manchester Royal Infirmary	36	44	31
John Radcliffe Hospital	35	44	31
Derriford Hospital	26	30	30
Hammersmith Hospital	29	35	28
University Hospital Coventry	51	54	28
Bristol Royal Infirmary	43	39	27
Castle Hill Hospital	23	27	27
Blackpool Victoria Hospital	23	26	26
Liverpool Heart and Chest Hospital	46	26	25
St Thomas' Hospital	30	40	25
Freeman Hospital	100*	54	23
Nottingham City Hospital	19	26	22
Royal Brompton Hospital	25	30	22
University Hospital of North Staffordshire	55	37	20
Wythenshawe Hospital	19	23	19
Papworth Hospital	33	32	18
Leeds General Infirmary	17	20	16
Mater Misericordiae Hospital	19	19	15
Basildon Hospital	20	22	11
Northern General Hospital	6	10	11
Glenfield Hospital	27	31	10
Queen Elizabeth Hospital	11	14	9
University Hospital of Wales	15	10	8
Royal Victoria Hospital	6	14	4
Spire St Anthony's Hospital (PP)	33	NA	NA
Spire Southampton Hospital (PP)	33	NA	NA
Cromwell Hospital (PP)	50	NA	NA

Target is 75%. NA no data available. PP private hospital. No hospital achieved target in 2021/22. Ranked by highest in 2021/22. (poor data quality/compliance)*



Proportion (%) of Urgent CABG performed within 7 days target is 75% (red bar). No hospital achieved target.

Proportion (%) of patients with Day of Surgery Admission (DOSA) for elective cardiac surgery

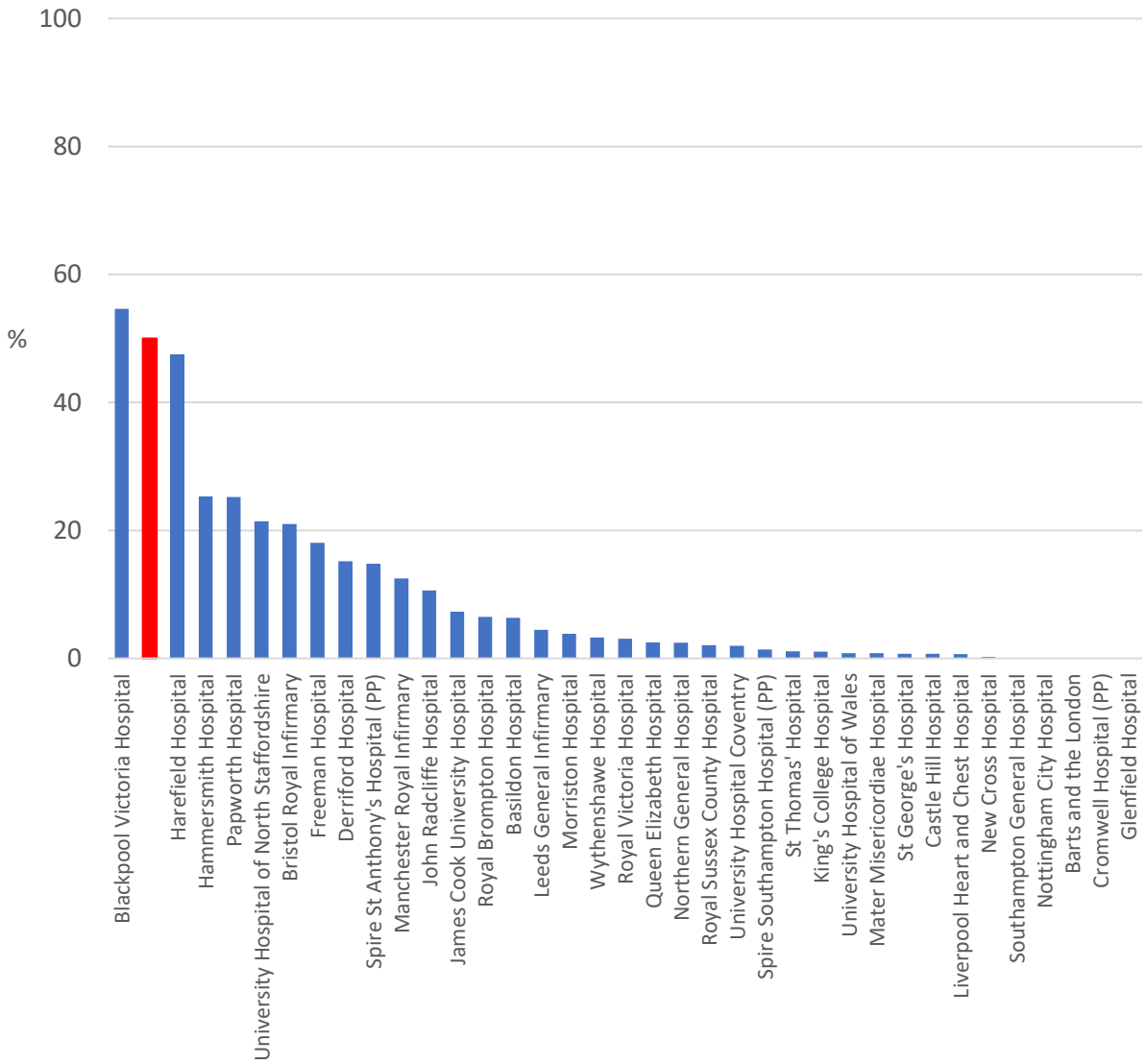


Region	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	NA	13.1	19.1	8.0	10.3
England	11.4	13.8	20.5	8.6	10.9
Northern Ireland	5.4	1.7	2.8	1.7	3.1
Republic of Ireland	NA	NA	6.1	2.1	0.8
Wales	1	1.8	1.9	0.6	2.4

UK data prior to 2018 included Scotland – so not presented here.

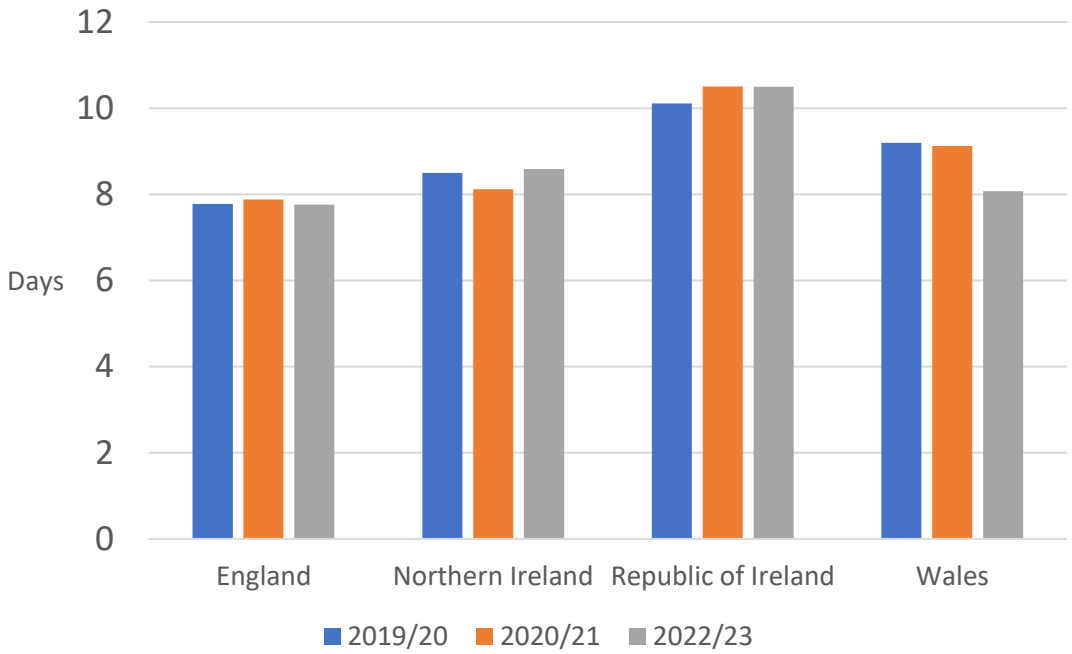
Hospital	2019/20	2020/21	2021/22
Blackpool Victoria Hospital	71.0	24.2	54.6
Harefield Hospital	56.4	24.4	47.5
Hammersmith Hospital	0.7	6.0	25.3
Papworth Hospital	36.6	38.2	25.2
University Hospital of North Staffordshire	21.5	3.7	21.4
Bristol Royal Infirmary	71.1	18.4	21.0
Freeman Hospital	15.2	19.2	18.1
Derriford Hospital	4.1	3.6	15.2
Spire St Anthony's Hospital (PP)	5.7	0	14.8
Manchester Royal Infirmary	4.2	4.8	12.5
John Radcliffe Hospital	28.4	16.9	10.6
James Cook University Hospital	51.1	0	7.3
Royal Brompton Hospital	18.2	0.5	6.5
Basildon Hospital	3.7	4.0	6.4
Leeds General Infirmary	4.9	1.2	4.5
Morriston Hospital	2.0	1.4	3.9
Wythenshawe Hospital	4.4	3.4	3.3
Royal Victoria Hospital	2.8	1.7	3.1
Queen Elizabeth Hospital	5.3	4.9	2.5
Northern General Hospital	0.7	0.3	2.5
Royal Sussex County Hospital	0.8	5.9	2.1
University Hospital Coventry	13.5	1.7	2.0
Spire Southampton Hospital (PP)	0.3	0.9	1.4
St Thomas' Hospital	31.4	0.4	1.1
King's College Hospital	10.1	2.2	1.1
University Hospital of Wales	1.7	0	0.8
Mater Misericordiae Hospital	6.1	2.1	0.8
St George's Hospital	3.1	0.5	0.7
Castle Hill Hospital	0	0	0.7
Liverpool Heart and Chest Hospital	35.9	0.0	0.7
New Cross Hospital	1.5	1.2	0.2
Southampton General Hospital	26.9	0.7	0
Nottingham City Hospital	0.3	0.5	0
Barts and the London	0.3	0.1	0
Cromwell Hospital (PP)	18.2	0	0
Glenfield Hospital	0	0	0

Ranked by highest DOSA rate in 2021/22. Target is 50% (four hospitals achieved this pre-COVID but only one last year). Red if below UK mean (10.3%) in 2021/22.



Target for proportion (%) of DOSA patients for elective surgery is 50% (red bar). One hospital achieved this target.

Post op length of stay (PLOS) following CABG (mean days)

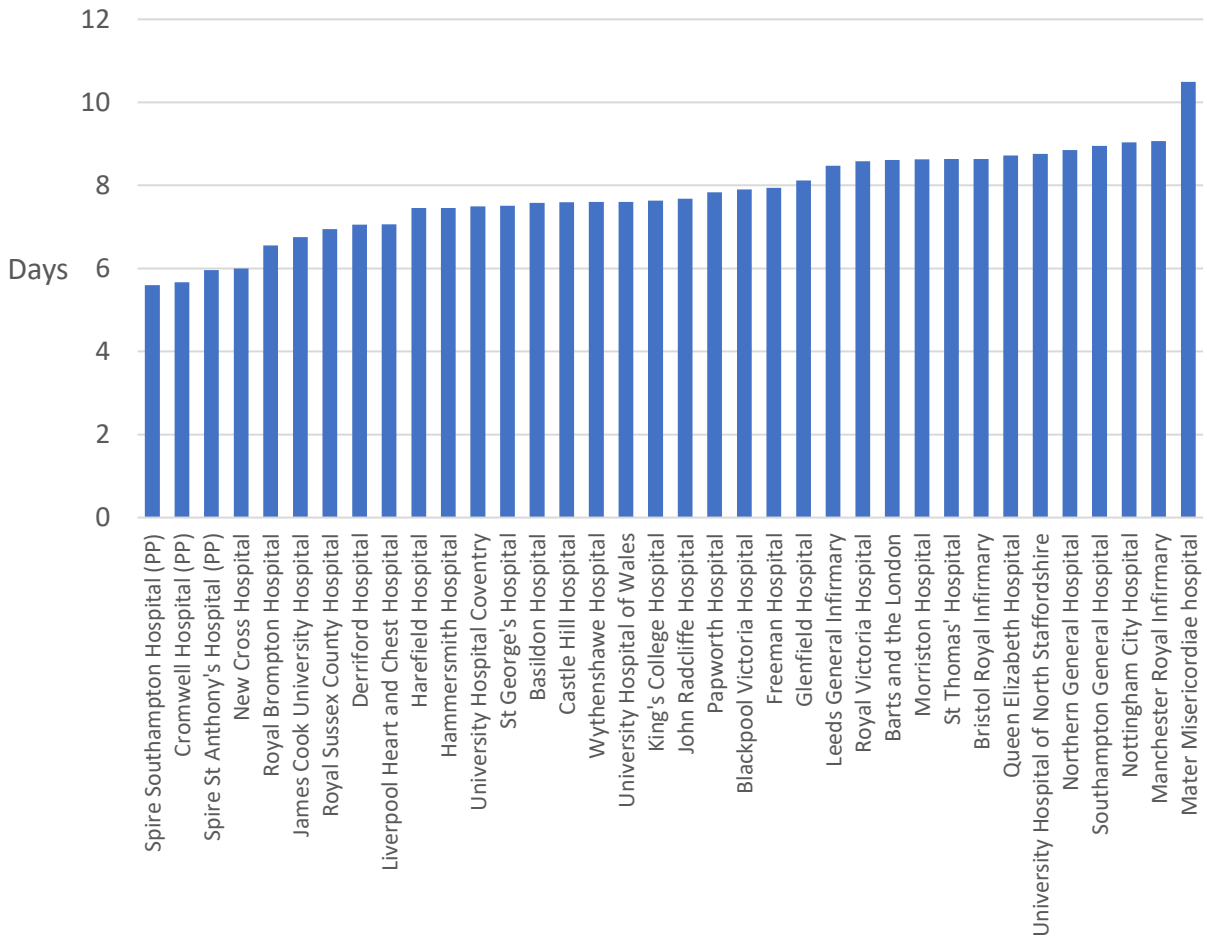


Region	2019/20	2020/21	2022/23
UK (excluding Scotland)	7.9	8.0	7.8
England	7.8	7.9	7.8
Northern Ireland	8.5	8.1	8.6
Republic of Ireland	10.1	10.5	10.5
Wales	9.2	9.1	8.1

UK	2019/22 aggregate (unit level data)
1st quartile	7.1
Median	7.7
3rd quartile	8.5

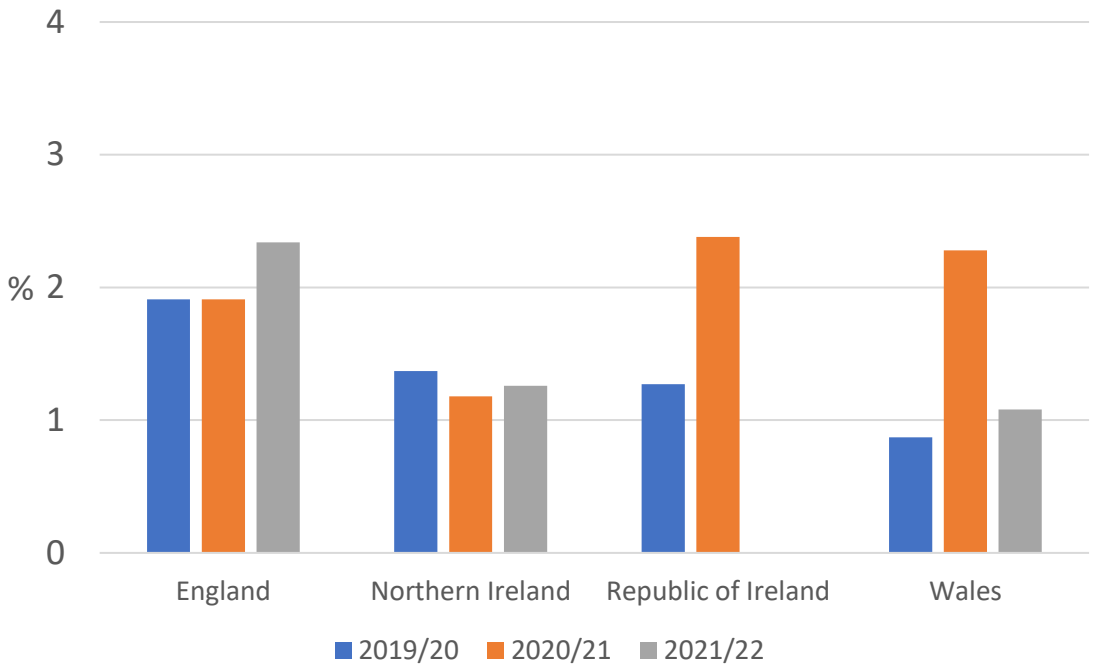
Hospital	2019/20	2020/21	2022/23
Spire Southampton Hospital (PP)	6.1	5.6	5.6
Cromwell Hospital (PP)	19.0	6.2	5.7
Spire St Anthony's Hospital (PP)	7.5	5.8	6.0
New Cross Hospital	6.5	6.0	6.0
Royal Brompton Hospital	6.7	6.6	6.6
James Cook University Hospital	6.7	6.1	6.8
Royal Sussex County Hospital	6.8	5.9	6.9
Derriford Hospital	7.3	6.3	7.1
Liverpool Heart and Chest Hospital	8.6	7.8	7.1
Harefield Hospital	8.1	7.5	7.5
Hammersmith Hospital	7.3	8.3	7.5
University Hospital Coventry	7.5	8.3	7.5
St George's Hospital	7.7	6.8	7.5
Basildon Hospital	7.0	7.4	7.6
Castle Hill Hospital	8.2	7.7	7.6
Wythenshawe Hospital	8.1	7.7	7.6
University Hospital of Wales	8.8	8.2	7.6
King's College Hospital	8.0	7.0	7.6
John Radcliffe Hospital	7.1	20.8	7.7
Papworth Hospital	7.9	7.8	7.8
Blackpool Victoria Hospital	7.3	8.1	7.9
Freeman Hospital	7.9	8.0	7.9
Glenfield Hospital	7.9	7.6	8.1
Leeds General Infirmary	9.0	8.7	8.5
Royal Victoria Hospital	8.5	8.1	8.6
Barts and the London	7.9	7.2	8.6
Morriston Hospital	9.6	10.0	8.6
St Thomas' Hospital	6.9	8.4	8.6
Bristol Royal Infirmary	7.5	7.1	8.6
Queen Elizabeth Hospital	8.4	6.4	8.7
University Hospital of North Staffordshire	7.2	8.4	8.8
Northern General Hospital	7.4	7.5	8.9
Southampton General Hospital	9.2	10.3	8.9
Nottingham City Hospital	7.9	8.9	9.0
Manchester Royal Infirmary	10.7	8.0	9.1
Mater Misericordiae Hospital	10.1	10.5	10.5

PLOS following CABG ranked by shortest in 2021/22. Green if in top quartile, red if in bottom quartile (compared to UK aggregate over last 3 years).



Post op length of stay following CABG (mean days) in 2021/22. PP private hospital. UK mean 7.8 days.

Reoperation for Bleeding (%) following CABG surgery

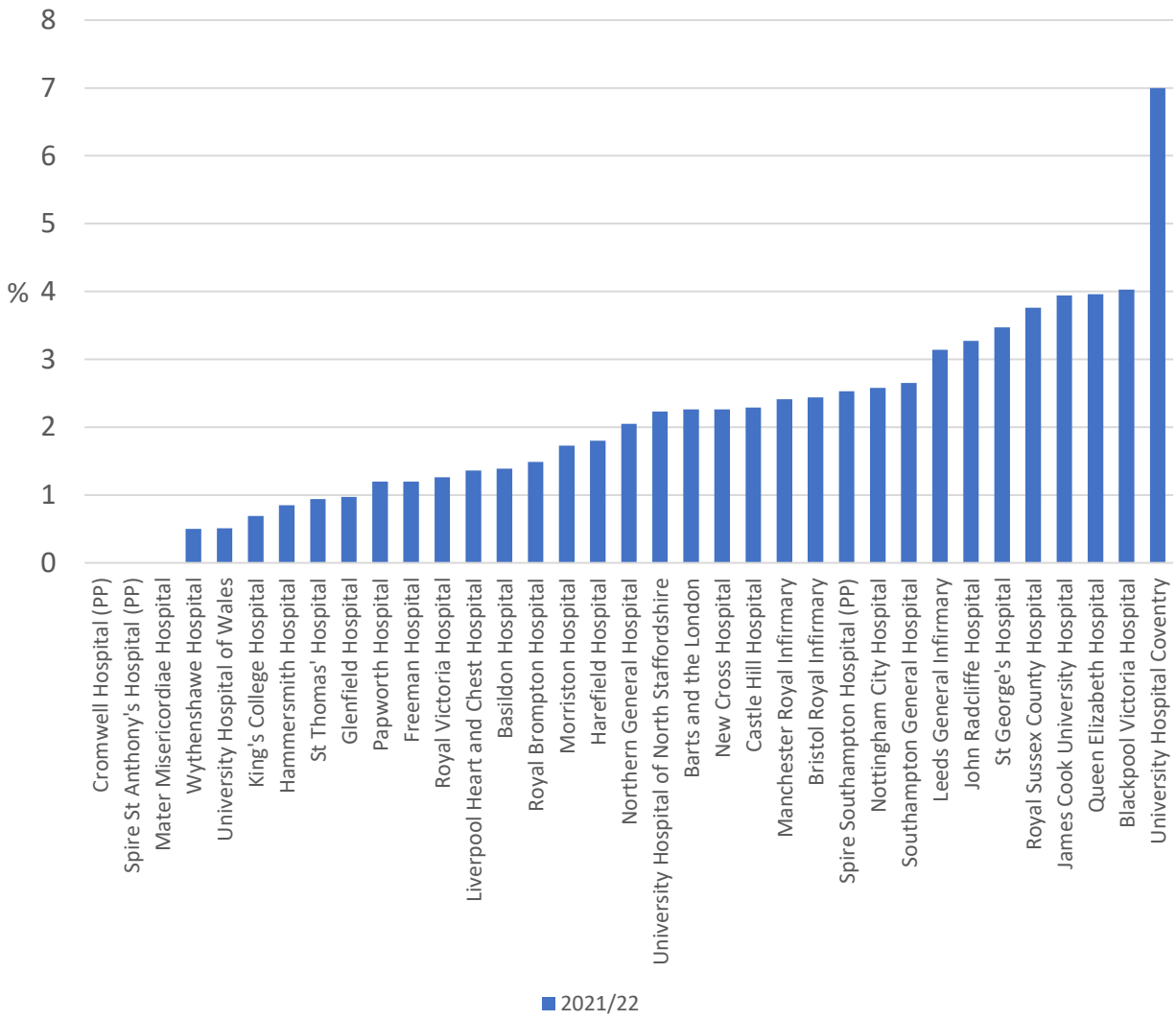


Nations	2019/20	2020/21	2021/22
UK (excluding Scotland)	1.85	1.92	2.24
England	1.91	1.91	2.34
Northern Ireland	1.37	1.18	1.26
Republic of Ireland	1.27	2.38	0
Wales	0.87	2.28	1.08

UK	2019/22 aggregate (unit level data)
1st quartile	0.97
Median	1.85
3rd quartile	2.7

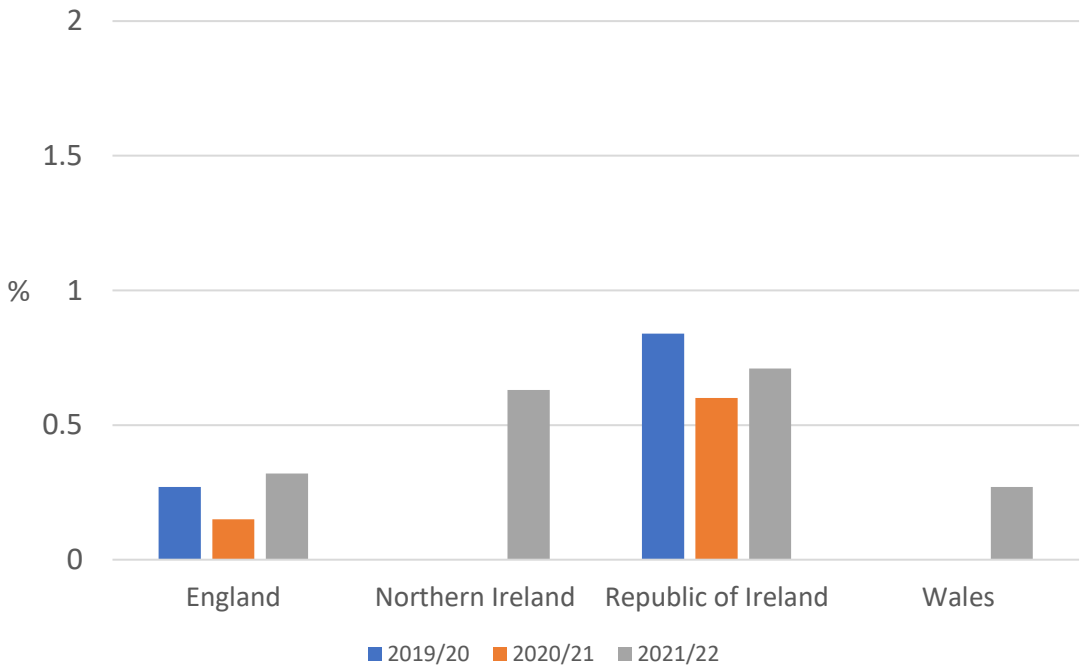
Hospital	Data Completeness	2019/20	2020/21	2021/22
Cromwell Hospital (PP)	100	0	0	0
Spire St Anthony's Hospital (PP)	96	4.35	0	0
Mater Misericordiae Hospital	99	1.27	2.38	0
Wythenshawe Hospital	100	1.35	0.67	0.5
University Hospital of Wales	97	0.44	1.85	0.51
King's College Hospital	98	0.53	0.52	0.69
Hammersmith Hospital	98	0	0	0.85
St Thomas' Hospital	100	0.46	0.97	0.94
Glenfield Hospital	100	2.52	1.96	0.97
Papworth Hospital	100	1.26	0.82	1.2
Freeman Hospital	91	0.45	1.21	1.2
Royal Victoria Hospital	100	1.37	1.18	1.26
Liverpool Heart and Chest Hospital	100	3.07	3.63	1.36
Basildon Hospital	92	1.9	0.99	1.39
Royal Brompton Hospital	100	2.55	2.1	1.49
Morriston Hospital	100	1.27	2.7	1.73
Harefield Hospital	98	1.35	0.72	1.8
Northern General Hospital	100	0.32	0	2.05
University Hospital of North	98	1.25	1.53	2.23
Barts and the London	100	1.72	1.53	2.26
New Cross Hospital	100	3.13	3.11	2.26
Castle Hill Hospital	100	3.33	3.49	2.29
Manchester Royal Infirmary	99	1.86	3.26	2.41
Bristol Royal Infirmary	99	2.76	1.53	2.44
Spire Southampton Hospital (PP)	100	2.86	0	2.53
Nottingham City Hospital	100	1.9	0.56	2.58
Southampton General Hospital	100	0.92	2.7	2.65
Leeds General Infirmary	100	1.77	2.02	3.14
John Radcliffe Hospital	100	2.3	2.67	3.27
St George's Hospital	100	2.54	0.64	3.47
Royal Sussex County Hospital	98	3.31	2.96	3.76
James Cook University Hospital	100	2.87	2.87	3.94
Queen Elizabeth Hospital	100	1.89	0.84	3.96
Blackpool Victoria Hospital	100	1.21	3.19	4.03
University Hospital Coventry	98	0.41	2.1	7.0
Derriford Hospital	3	87.5*	83.33*	70*

Ranked by rates in 2021/22. Data completeness red if <90%, green if 100%. Rates calculated on completed data only (very poor data compliance). Green if performance last year in top quartile, red if in bottom quartile (compared to UK aggregate over last 3 years).*



Reoperation for bleeding after CABG rates (%) in 2021/22. UK mean 2.24%.

Deep Sternal Wound Infection (DSWI) rate (%) following CABG (requiring surgical debridement or reoperation)

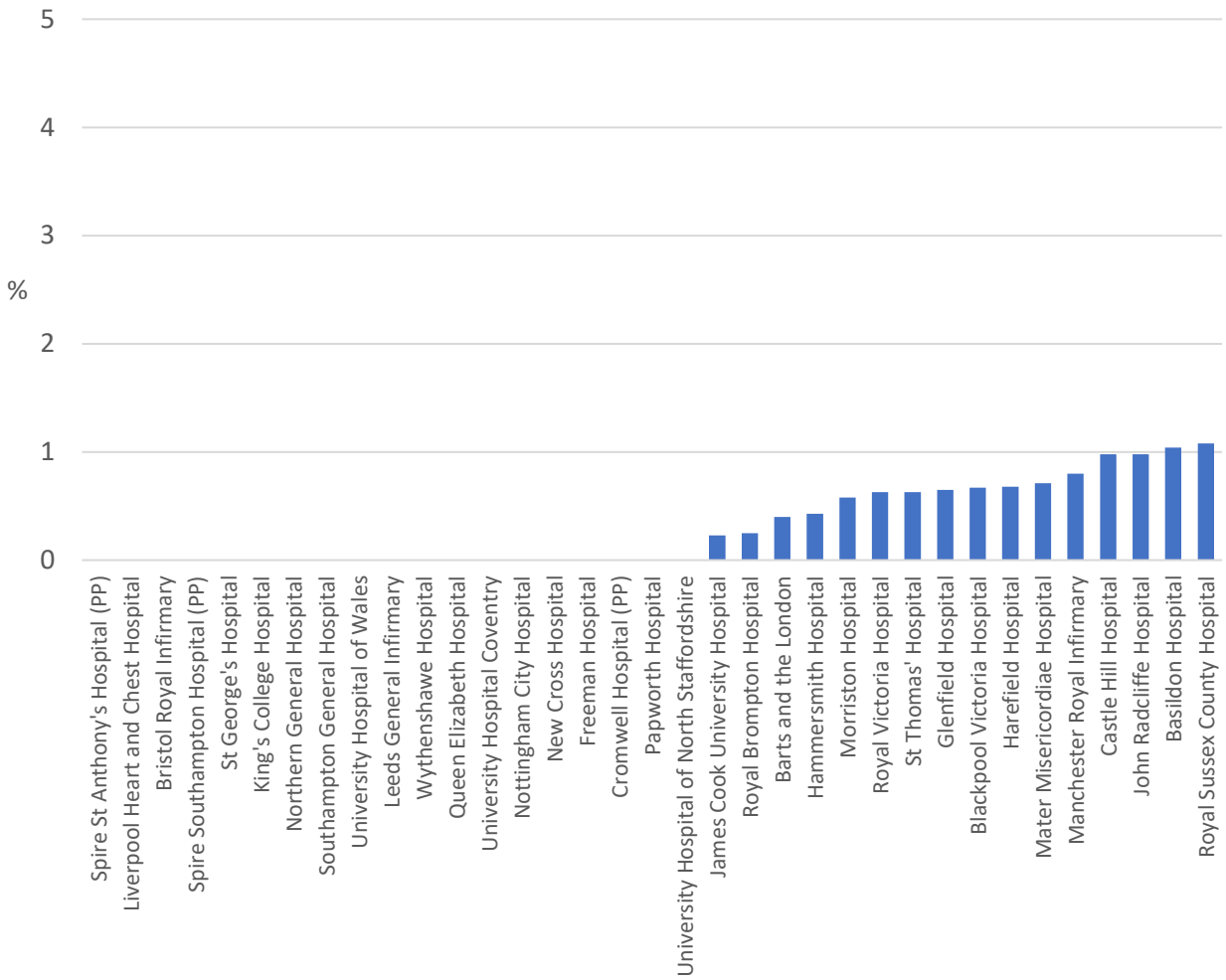


Nations	2019/20	2020/21	2021/22
UK (excluding Scotland)	0.26	0.15	0.33
England	0.27	0.15	0.32
Northern Ireland	0	0	0.63
Republic of Ireland	0.84	0.6	0.71
Wales	0	0	0.27

UK	2019/22 aggregate (unit level data)
1st quartile	0
Median	0
3rd quartile	0.47

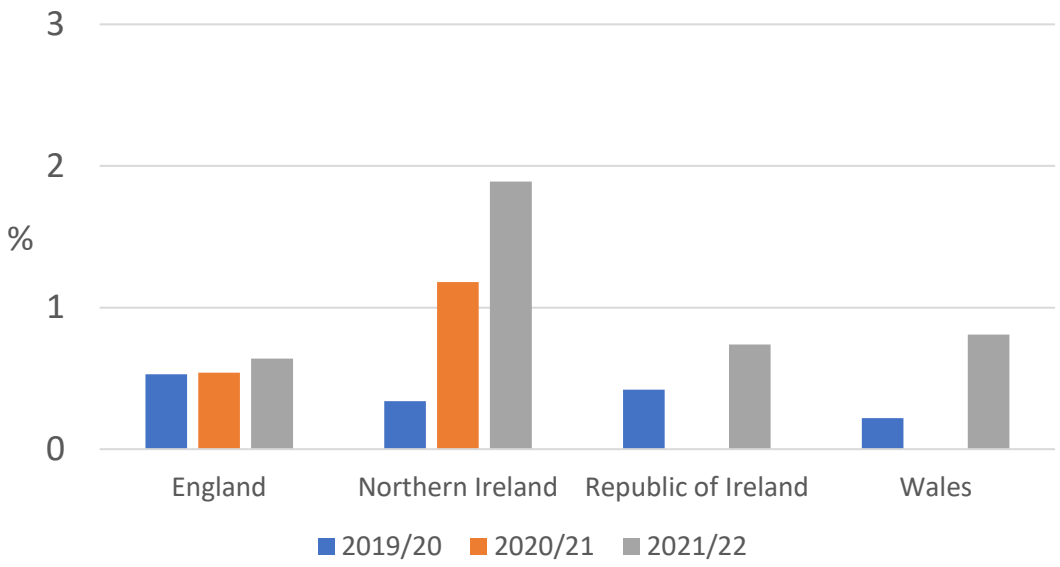
Hospital	Data Completeness	2019/20	2020/21	2021/22
Spire St Anthony's Hospital (PP)	96	0	0	0
Liverpool Heart and Chest Hospital	100	0	0	0
Bristol Royal Infirmary	99	0	0	0
Spire Southampton Hospital (PP)	100	0	0	0
St George's Hospital	100	0	0	0
King's College Hospital	98	0	0	0
Northern General Hospital	100	0	0	0
Southampton General Hospital	100	0	0	0
University Hospital of Wales	97	0	0	0
Leeds General Infirmary	100	0.22	0	0
Wythenshawe Hospital	100	0.27	0	0
Queen Elizabeth Hospital	100	0.38	0	0
University Hospital Coventry	98	0.41	0	0
Nottingham City Hospital	100	0.47	0	0
New Cross Hospital	100	0.48	0	0
Freeman Hospital	91	1.35	0	0
Cromwell Hospital (PP)	100	11.11	0	0
Papworth Hospital	100	0	0.27	0
University Hospital of North	98	0	0.51	0
James Cook University Hospital	100	0	0	0.23
Royal Brompton Hospital	100	0.26	0.7	0.25
Barts and the London	100	0.43	0.15	0.4
Hammersmith Hospital	98	0	0	0.43
Morriston Hospital	100	0	0	0.58
Royal Victoria Hospital	100	0	0	0.63
St Thomas' Hospital	100	0	0	0.63
Glenfield Hospital	100	0.46	0.49	0.65
Blackpool Victoria Hospital	100	1.01	0.23	0.67
Harefield Hospital	98	0.67	0.24	0.68
Mater Misericordiae Hospital	99	0.84	0.6	0.71
Manchester Royal Infirmary	99	0	0.47	0.8
Castle Hill Hospital	100	0.22	0	0.98
John Radcliffe Hospital	100	0.66	1.07	0.98
Basildon Hospital	92	0	0	1.04
Royal Sussex County Hospital	98	0.37	0	1.08
Derriford Hospital	3	12.5*	0*	10*

Ranked by rates in 2021/22. Data completeness red if <90%, green if 100%. Rates calculated on completed data only (very poor data compliance). Green if performance last year in top quartile, red if in bottom quartile (compared to UK aggregate over last 3 years).*



Deep Sternal Wound Infection after CABG rates (%) in 2021/22. UK mean 0.33%.

New post-operative any neurological event (CVA and TIA combined) rate (%) following CABG



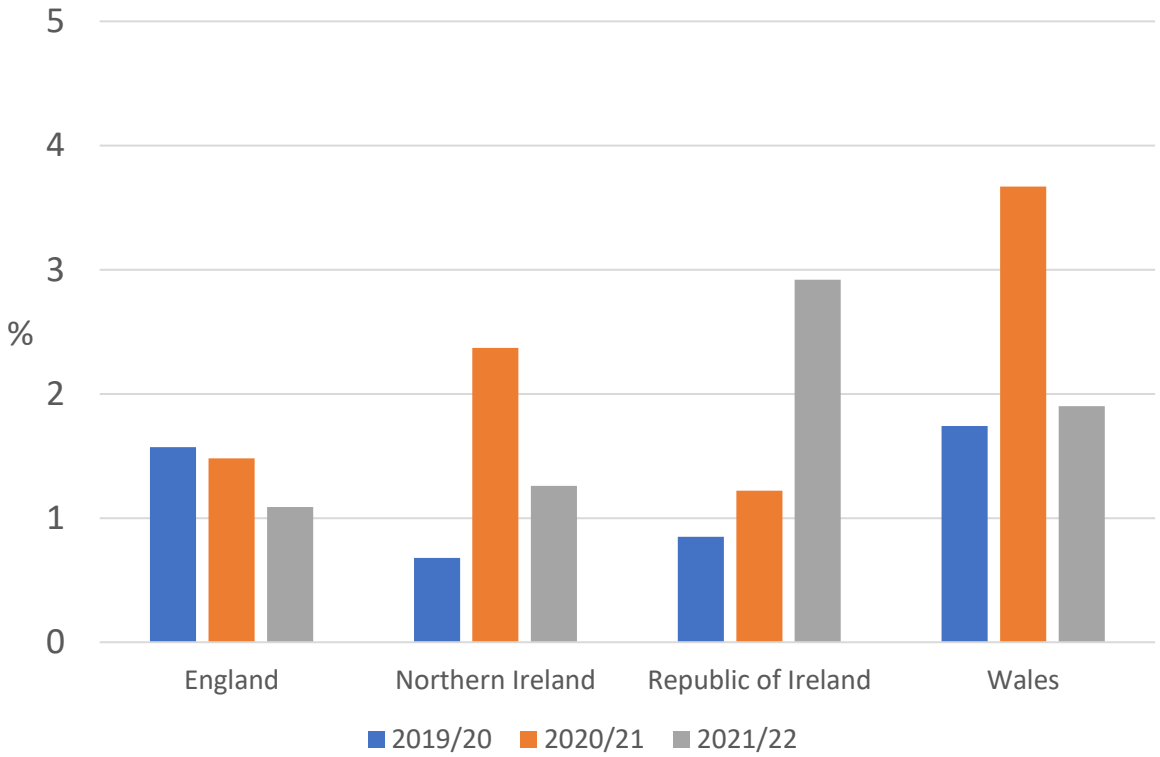
Nations	2019/20	2020/21	2021/22
UK (excluding Scotland)	0.51	0.53	0.67
England	0.53	0.54	0.64
Northern Ireland	0.34	1.18	1.89
Republic of Ireland	0.42	0	0.74
Wales	0.22	0	0.81

UK	2019/22 aggregate (unit level data)
1st quartile	0
Median	0.35
3rd quartile	0.70

Hospital	Data Completeness (%)	2019/20	2020/21	2021/22
Spire St Anthony's Hospital (PP)	96	0	0	0
Spire Southampton Hospital (PP)	100	0	0	0
Cromwell Hospital (PP)	100	0	0	0
Hammersmith Hospital	98	0	0	0
Northern General Hospital	100	0	0	0
University Hospital of Wales	97	0	0	0
Leeds General Infirmary	100	0.22	0.4	0
Glenfield Hospital	100	0.23	0.49	0
University Hospital of North	96	0.32	0.5	0
Nottingham City Hospital	100	0	0.56	0
University Hospital Coventry	98	0.41	0.71	0
St Thomas' Hospital	100	0.46	0	0.31
Basildon Hospital	100	1	1.42	0.33
Blackpool Victoria Hospital	100	0.4	0.23	0.34
St George's Hospital	100	0.28	0	0.35
Bristol Royal Infirmary	99	0.23	0.31	0.49
New Cross Hospital	100	0.24	0	0.5
Wythenshawe Hospital	99	0.54	0.34	0.5
Royal Brompton Hospital	100	0.51	0.35	0.5
Royal Sussex County Hospital	97	0.74	0.74	0.55
Freeman Hospital	91	0.45	0	0.6
Southampton General Hospital	97	0.46	0	0.63
Harefield Hospital	99	0.45	0.24	0.67
James Cook University Hospital	100	0.57	0.86	0.69
King's College Hospital	92	0	1.78	0.71
Mater Misericordiae Hospital	98	0.42	0	0.74
Castle Hill Hospital	100	1.11	0.44	0.98
Queen Elizabeth Hospital	100	1.13	0.84	0.99
John Radcliffe Hospital	89	0	0	1.18
Manchester Royal Infirmary	100	0	0	1.2
Barts and the London	100	0.86	0.76	1.33
Liverpool Heart and Chest Hospital	100	2.17	2.82	1.36
Derriford Hospital	100	0.34	0	1.4
Morriston Hospital	100	0.42	0	1.73
Royal Victoria Hospital	100	0.34	1.18	1.89
Papworth Hospital	71	0	0	2.22

Ranked by rates in 2021/22. Data completeness yellow if <90%, red if<80%. Green if in top quartile (compared to UK aggregate over last 3 years). Lower quartile units not highlighted. Some care is needed interpreting this data, as higher reporting units may be collecting data more carefully (and units with low rates may be underreporting). Strokes can be difficult to diagnose especially whilst a patient is on ITU (for example in patients with weakness or confusion). Increased use of CT scanning and involvement of Stroke teams may identify some cases that are less clinically obvious.

New post-operative kidney failure (requiring renal support therapy) following CABG (%)

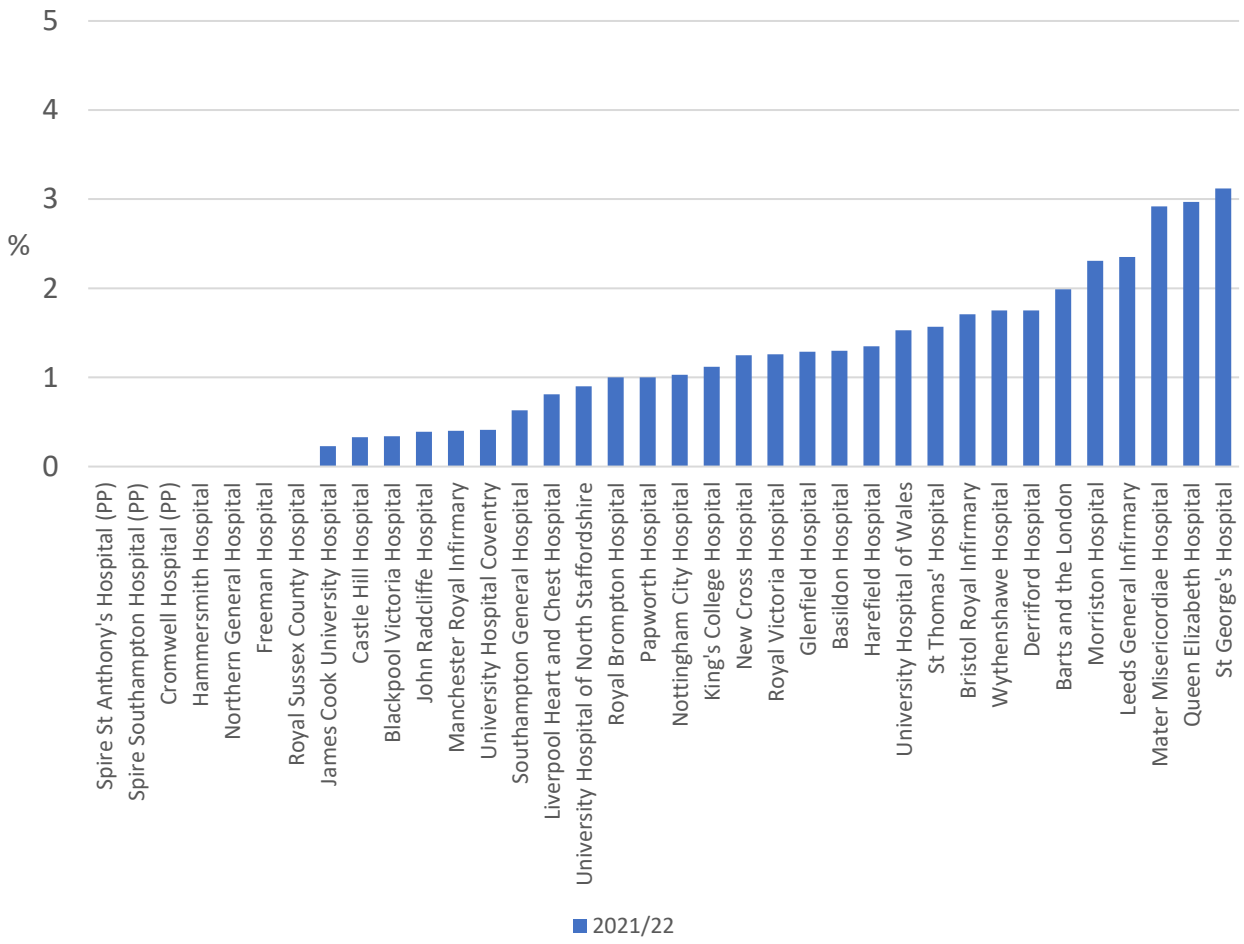


Nations	2019/20	2020/21	2021/22
UK (excluding Scotland)	1.54	1.55	1.14
England	1.57	1.48	1.09
Northern Ireland	0.68	2.37	1.26
Republic of Ireland	0.85	1.22	2.92
Wales	1.74	3.67	1.9

UK	2019/22 aggregate (unit level data)
1st quartile	0.45
Median	1.24
3rd quartile	1.83

Hospital	Data Completeness (%)	2019/20	2020/21	2021/22
Spire St Anthony's Hospital (PP)	96	0	0	0
Spire Southampton Hospital (PP)	99	0	0	0
Cromwell Hospital (PP)	100	0	0	0
Hammersmith Hospital	98	0	0	0
Northern General Hospital	100	0	0	0
Freeman Hospital	91	1.8	0.61	0
Royal Sussex County Hospital	97	1.47	0.75	0
James Cook University Hospital	100	1.34	0.29	0.23
Castle Hill Hospital	100	1.56	2.18	0.33
Blackpool Victoria Hospital	98	0.62	1.17	0.34
John Radcliffe Hospital	89	1.78	0	0.39
Manchester Royal Infirmary	100	1.54	1.84	0.4
University Hospital Coventry	98	0.83	1.42	0.41
Southampton General Hospital	97	0.69	0.71	0.63
Liverpool Heart and Chest Hospital	100	2.04	2.22	0.81
University Hospital of North	97	0	1.5	0.9
Royal Brompton Hospital	100	2.04	0.7	1
Papworth Hospital	100	1.8	2.72	1
Nottingham City Hospital	100	0.95	1.69	1.03
King's College Hospital	87	0.61	0	1.12
New Cross Hospital	100	0.96	1.56	1.25
Royal Victoria Hospital	100	0.68	2.37	1.26
Glenfield Hospital	100	1.83	1.96	1.29
Basildon Hospital	100	3.34	3.77	1.3
Harefield Hospital	99	2.71	1.44	1.35
University Hospital of Wales	96	1.34	5.61	1.53
St Thomas' Hospital	100	0.46	1.94	1.57
Bristol Royal Infirmary	99	1.38	1.22	1.71
Wythenshawe Hospital	100	1.08	0.68	1.75
Derriford Hospital	100	4.03	1.15	1.75
Barts and the London	100	2.69	2.14	1.99
Morriston Hospital	100	2.12	1.8	2.31
Leeds General Infirmary	100	1.77	2.02	2.35
Mater Misericordiae Hospital	98	0.85	1.22	2.92
Queen Elizabeth Hospital	100	2.26	0.84	2.97
St George's Hospital	100	2.54	4.46	3.12

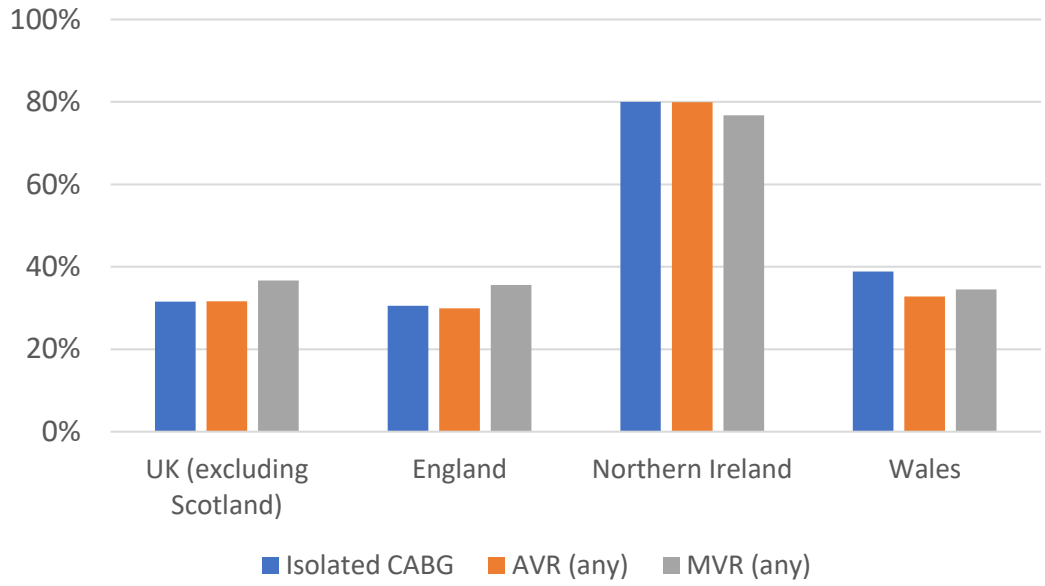
Ranked by rates in 2021/22. Data completeness yellow if <90%. Green if in top quartile, red if in bottom quartile in 2021/22 (compared to UK aggregate for last 3 years).



Kidney failure rate (%) requiring renal support therapy following CABG in 2021/22 – by unit. UK mean 1.14%.

New non-mortality Performance and Outcome metrics in 2023 report

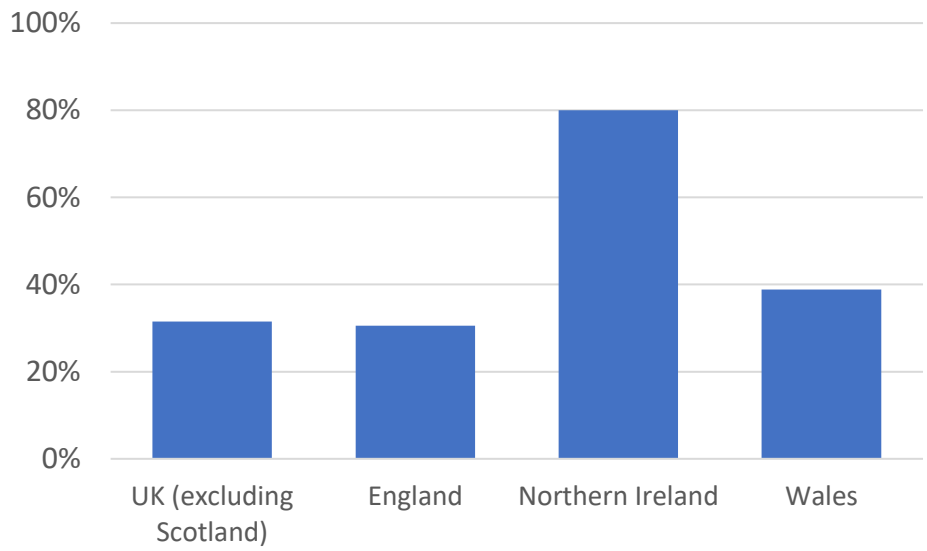
Proportion (%) of patients discussed pre-operatively at a quorate Multi-disciplinary Team (MDT) meeting – by procedure and nation (2021/22)



	Isolated CABG	AVR (any)	MVR (any)
UK (excluding Scotland)	31.5%	31.6%	36.6%
England	30.5%	29.9%	35.6%
Northern Ireland	80.0%	79.9%	76.8%
Wales	38.8%	32.8%	34.5%

New variable in NACSA audit from 2021/22. Data missing for 37.2% of procedures (for UK). Rates calculated based on % recorded as Yes as proportion of total cases performed (i.e. missing data treated as No) on the basis that variable asks whether a documented quorate MDT has taken place. Actual MDT rates may therefore be higher. Data on rates of data missing can be found in subsequent tables (by hospital). This data also includes emergencies – where MDT discussion is unlikely to be possible or appropriate.

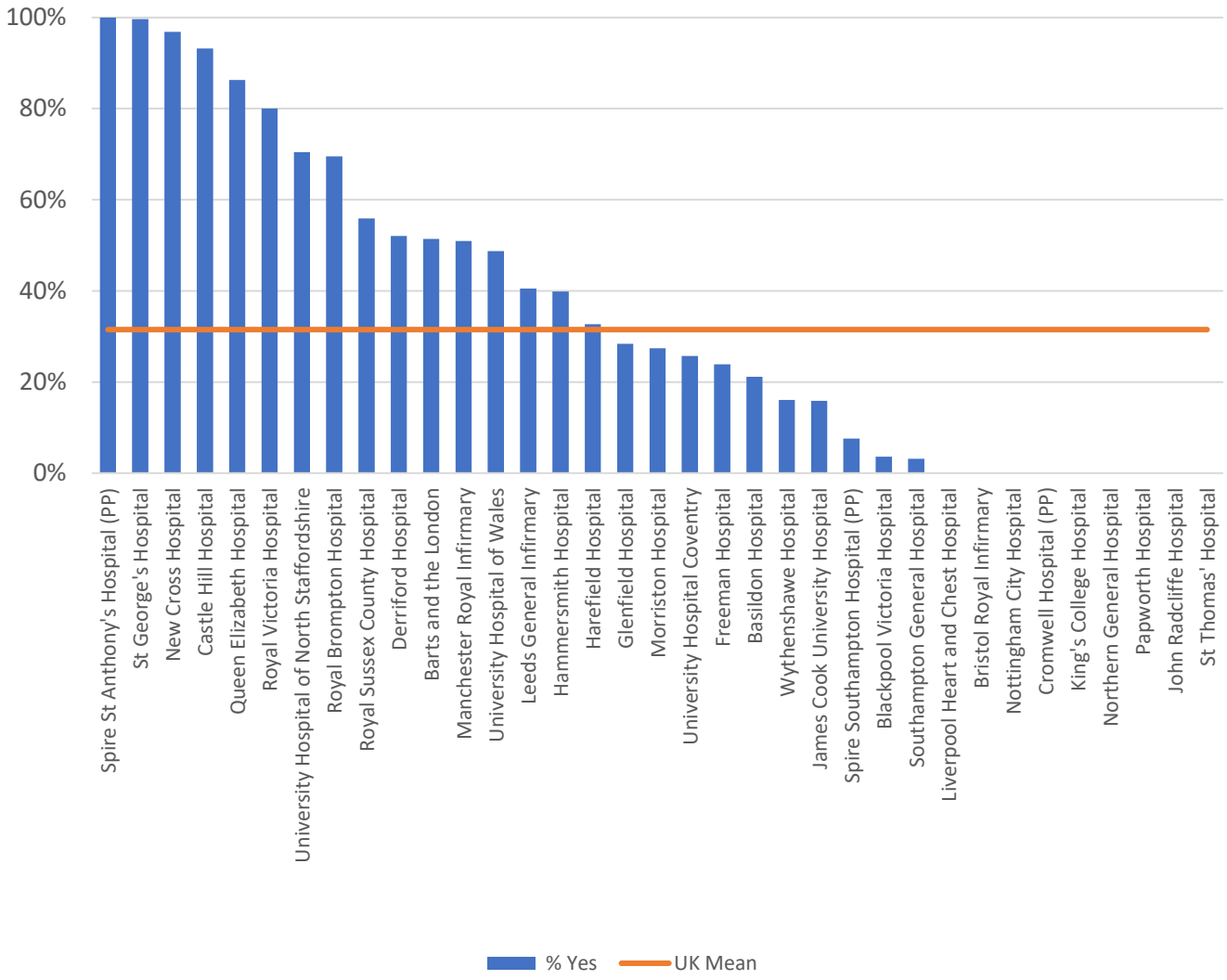
Proportion (%) of isolated CABG discussed pre-operatively at a quorate Multi-disciplinary Team (MDT) meeting (2021/22)



	Yes	No	Missing	% Yes
UK (excluding Scotland)	3453	3544	3956	31.5%
England	3179	3297	3941	30.5%
Northern Ireland	128	32	0	80.0%
Wales	146	215	15	38.8%

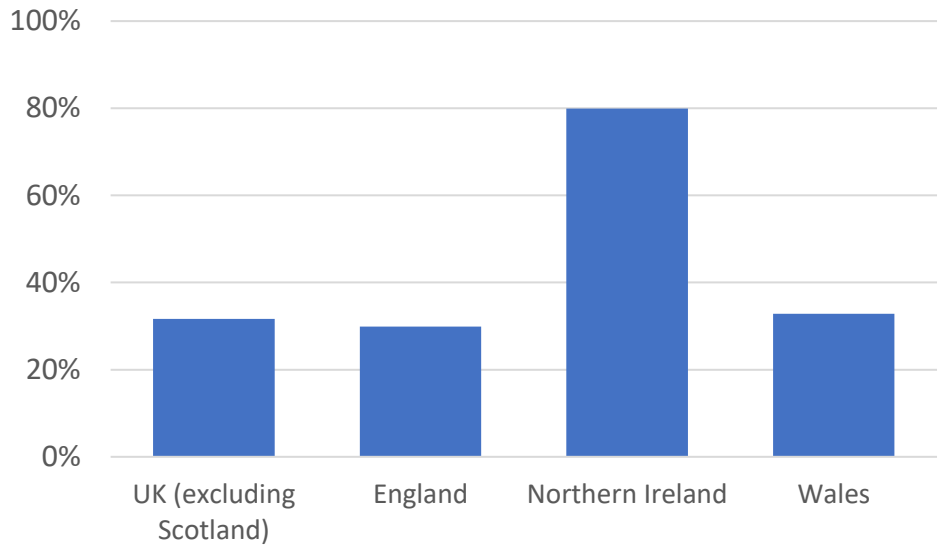
Hospital	Yes	No	Missing	% Yes
Spire St Anthony's Hospital (PP)	24		0	100.0%
Barts and the London	412	378	11	51.4%
Basildon Hospital	71	27	238	21.1%
Liverpool Heart and Chest Hospital			745	0.0%
Bristol Royal Infirmary			427	0.0%
Spire Southampton Hospital (PP)	6	54	19	7.6%
Castle Hill Hospital	288	3	18	93.2%
Nottingham City Hospital			210	0.0%
Cromwell Hospital (PP)			3	0.0%
Freeman Hospital	42	128	6	23.9%
St George's Hospital	292	1	0	99.7%
Glenfield Hospital	93	235	0	28.4%
Hammersmith Hospital	102	116	38	39.8%
Harefield Hospital	152	302	11	32.7%
King's College Hospital			309	0.0%
Leeds General Infirmary	107	156	1	40.5%
Morriston Hospital	48	120	7	27.4%
Manchester Royal Infirmary	139	24	110	50.9%
New Cross Hospital	397	13	0	96.8%
Northern General Hospital			199	0.0%
Royal Brompton Hospital	285	125	0	69.5%
Papworth Hospital			544	0.0%
Derriford Hospital	153	141	0	52.0%
Queen Elizabeth Hospital	88	13	1	86.3%
John Radcliffe Hospital			319	0.0%
Royal Sussex County Hospital	114	78	12	55.9%
Royal Victoria Hospital	128	32	0	80.0%
James Cook University Hospital	70	371	0	15.9%
Southampton General Hospital	11	327	9	3.2%
St Thomas' Hospital			323	0.0%
University Hospital of North Staffordshire	181	14	62	70.4%
University Hospital of Wales	98	95	8	48.8%
Blackpool Victoria Hospital	22	529	61	3.6%
University Hospital Coventry	65	184	4	25.7%
Wythenshawe Hospital	65	78	261	16.1%

Proportion (of total cases) of isolated CABG where preop MDT documented as Yes (2021/22). Green if no data missing. Red if no data submitted.



Proportion (of total cases) of isolated CABG where preop MDT documented as Yes (2021/22). Hospitals with no data recorded shown as 0%. UK mean 31.5%.

Proportion (%) of AVR (any) discussed pre-operatively at a quorate Multi-disciplinary Team (MDT) meeting (2021/22)

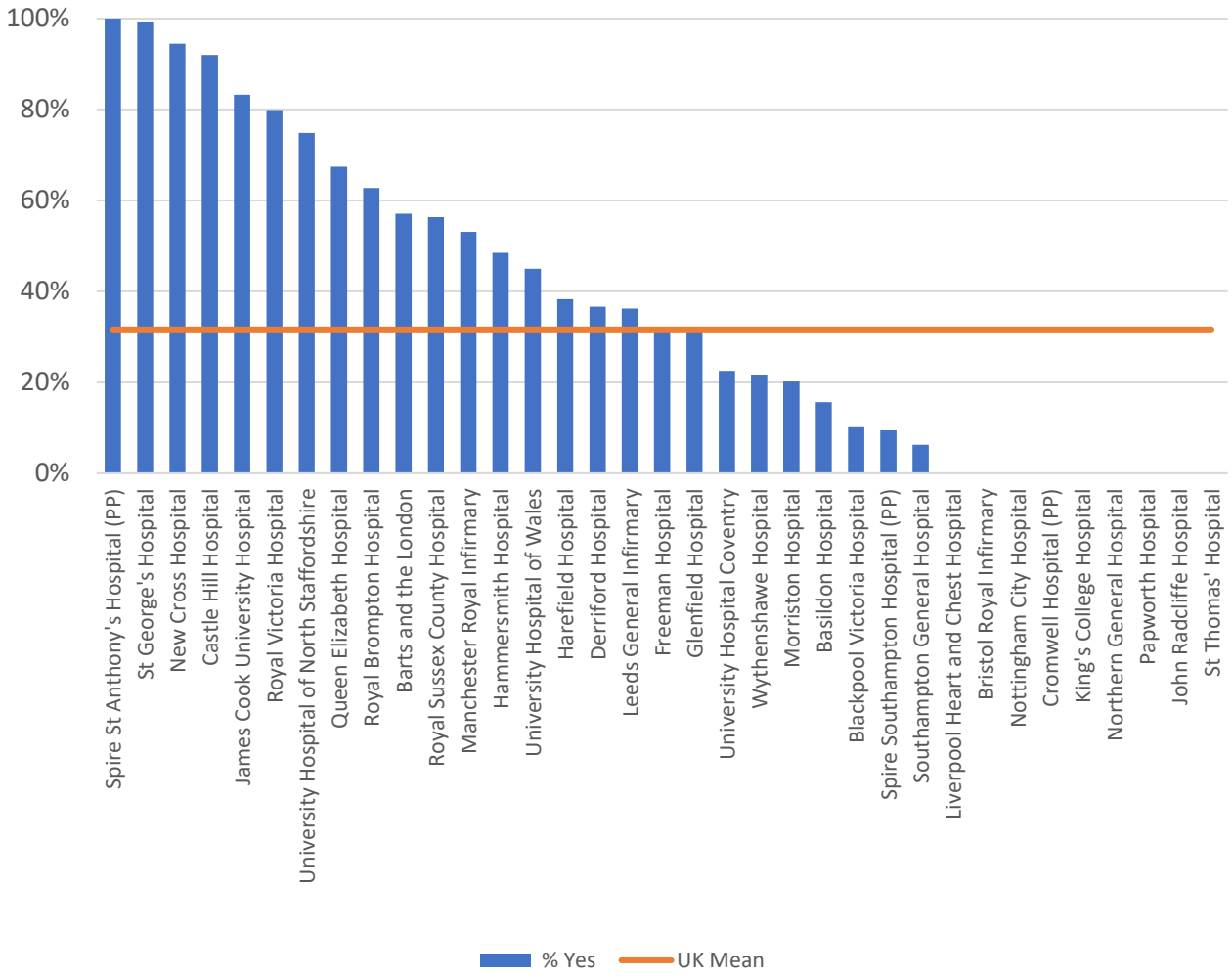


	Yes	No	Missing	% Yes
UK (excluding Scotland)	2645	2645	3071	31.6%
England	2305	2351	3048	29.9%
Northern Ireland	211	53	0	79.9%
Wales	129	241	23	32.8%

Any AVR includes both isolated and combined AVR procedures.

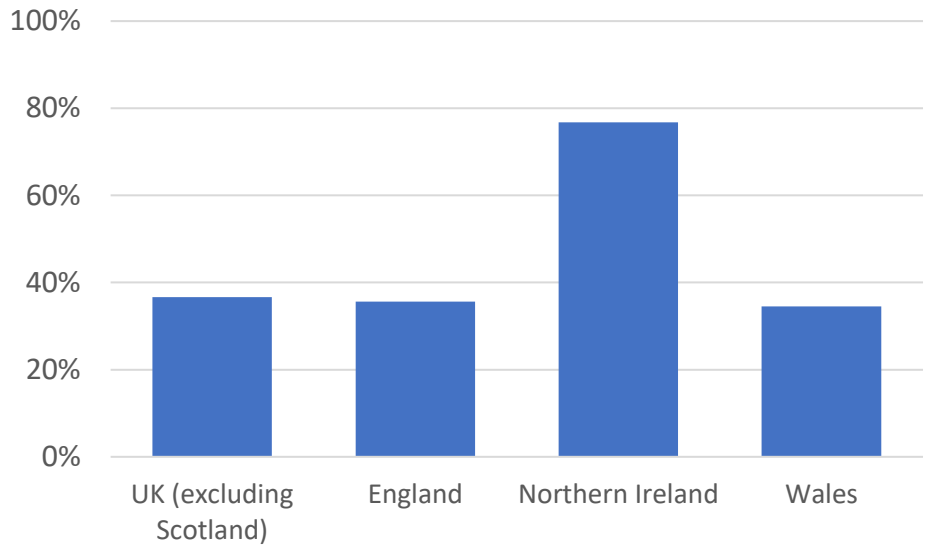
Hospital	Yes	No	Missing	% Yes
Spire St Anthony's Hospital (PP)	22		0	100%
Barts and the London	289	211	6	57.1%
Basildon Hospital	34	29	154	15.7%
Liverpool Heart and Chest Hospital			524	0%
Bristol Royal Infirmary			348	0%
Spire Southampton Hospital (PP)	19	145	37	9.5%
Castle Hill Hospital	161	4	10	92.0%
Nottingham City Hospital			177	0%
Cromwell Hospital (PP)			5	0%
Freeman Hospital	70	151	2	31.4%
St George's Hospital	119	1	0	99.2%
Glenfield Hospital	100	220	0	31.3%
Hammersmith Hospital	47	40	10	48.5%
Harefield Hospital	111	172	7	38.3%
King's College Hospital			205	0%
Leeds General Infirmary	92	161	1	36.2%
Morriston Hospital	39	139	15	20.2%
Manchester Royal Infirmary	43	9	29	53.1%
New Cross Hospital	258	15	0	94.5%
Northern General Hospital			261	0%
Royal Brompton Hospital	212	126	0	62.7%
Papworth Hospital			538	0%
Derriford Hospital	104	180	0	36.6%
Queen Elizabeth Hospital	58	27	1	67.4%
John Radcliffe Hospital			201	0%
Royal Sussex County Hospital	93	65	7	56.4%
Royal Victoria Hospital	211	53	0	79.9%
James Cook University Hospital	179	35	1	83.3%
Southampton General Hospital	24	353	5	6.3%
St Thomas' Hospital			259	0%
University Hospital of North	137	13	33	74.9%
University Hospital of Wales	90	102	8	45.0%
Blackpool Victoria Hospital	28	231	17	10.1%
University Hospital Coventry	32	109	1	22.5%
Wythenshawe Hospital	73	54	209	21.7%

Proportion (of total cases) of AVR (any) where preop MDT documented as Yes (2021/22). Green if no data missing. Red if no data submitted.



Proportion (of total cases) of AVR (any) where preop MDT documented as Yes (2021/22). Hospitals with no data recorded shown as 0%. UK mean 31.6%.

Proportion (%) of MVR (any) discussed pre-operatively at a quorate Multi-disciplinary Team (MDT) meeting (2021/22)

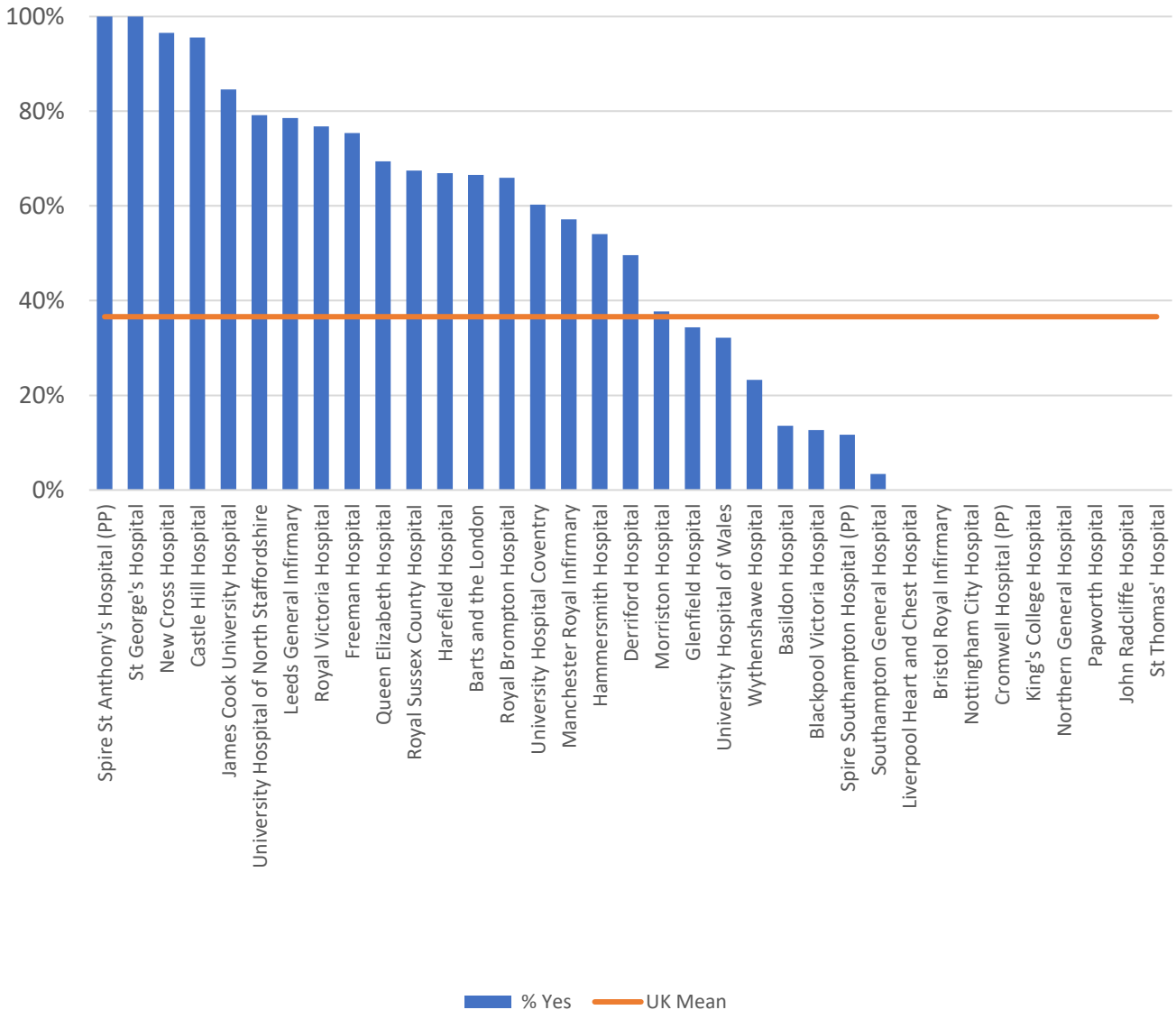


	Yes	No	Missing	MDT%
UK (excluding Scotland)	1353	889	1450	36.6%
England	1227	778	1443	35.6%
Northern Ireland	76	23	0	76.8%
Wales	50	88	7	34.5%

Any MVR includes both repair and replacements, as well any combined MVR procedures.

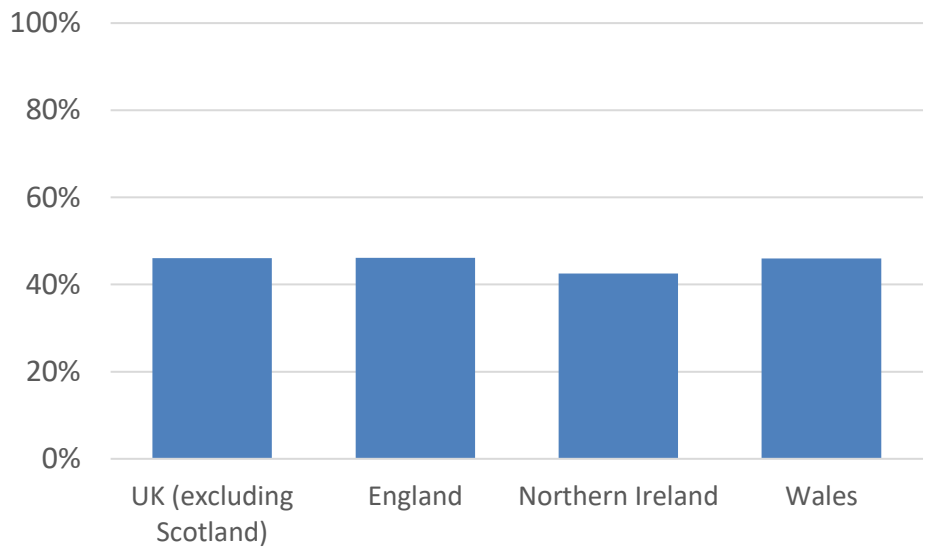
Hospital	Yes	No	Missing	% Yes
Spire St Anthony's Hospital (PP)	9		0	100.0%
Barts and the London	169	84	1	66.5%
Basildon Hospital	13	18	65	13.5%
Liverpool Heart and Chest Hospital			206	0.0%
Bristol Royal Infirmary			143	0.0%
Spire Southampton Hospital (PP)	9	57	11	11.7%
Castle Hill Hospital	43		2	95.6%
Nottingham City Hospital			68	0.0%
Cromwell Hospital (PP)			0	N/A
Freeman Hospital	52	17	0	75.4%
St George's Hospital	64		0	100.0%
Glenfield Hospital	33	63	0	34.4%
Hammersmith Hospital	40	23	11	54.1%
Harefield Hospital	89	38	6	66.9%
King's College Hospital			143	0.0%
Leeds General Infirmary	66	18	0	78.6%
Morriston Hospital	23	31	7	37.7%
Manchester Royal Infirmary	16	1	11	57.1%
New Cross Hospital	140	5	0	96.6%
Northern General Hospital			134	0.0%
Royal Brompton Hospital	126	65	0	66.0%
Papworth Hospital			268	0.0%
Derriford Hospital	58	59	0	49.6%
Queen Elizabeth Hospital	25	11	0	69.4%
John Radcliffe Hospital			137	0.0%
Royal Sussex County Hospital	58	27	1	67.4%
Royal Victoria Hospital	76	23	0	76.8%
James Cook University Hospital	88	16	0	84.6%
Southampton General Hospital	5	140	3	3.4%
St Thomas' Hospital			148	0.0%
University Hospital of North Staffordshire	38	2	8	79.2%
University Hospital of Wales	27	57	0	32.1%
Blackpool Victoria Hospital	12	81	2	12.6%
University Hospital Coventry	44	29	0	60.3%
Wythenshawe Hospital	30	24	75	23.3%

Proportion (of total cases) of MVR (any – replacement or repair, with or without concomitant procedures) where preop MDT documented as Yes (2021/22). Green if no data missing. Red if no data submitted.



Proportion (of total cases) of MVR (any – replace or repair, with or without concomitant procedures) where preop MDT documented as Yes (2021/22). Hospitals with no data recorded shown as 0%. UK mean 36.6%.

Proportion (%) of patients receiving a Blood Transfusion (of any type) – isolated CABG (2021/22)

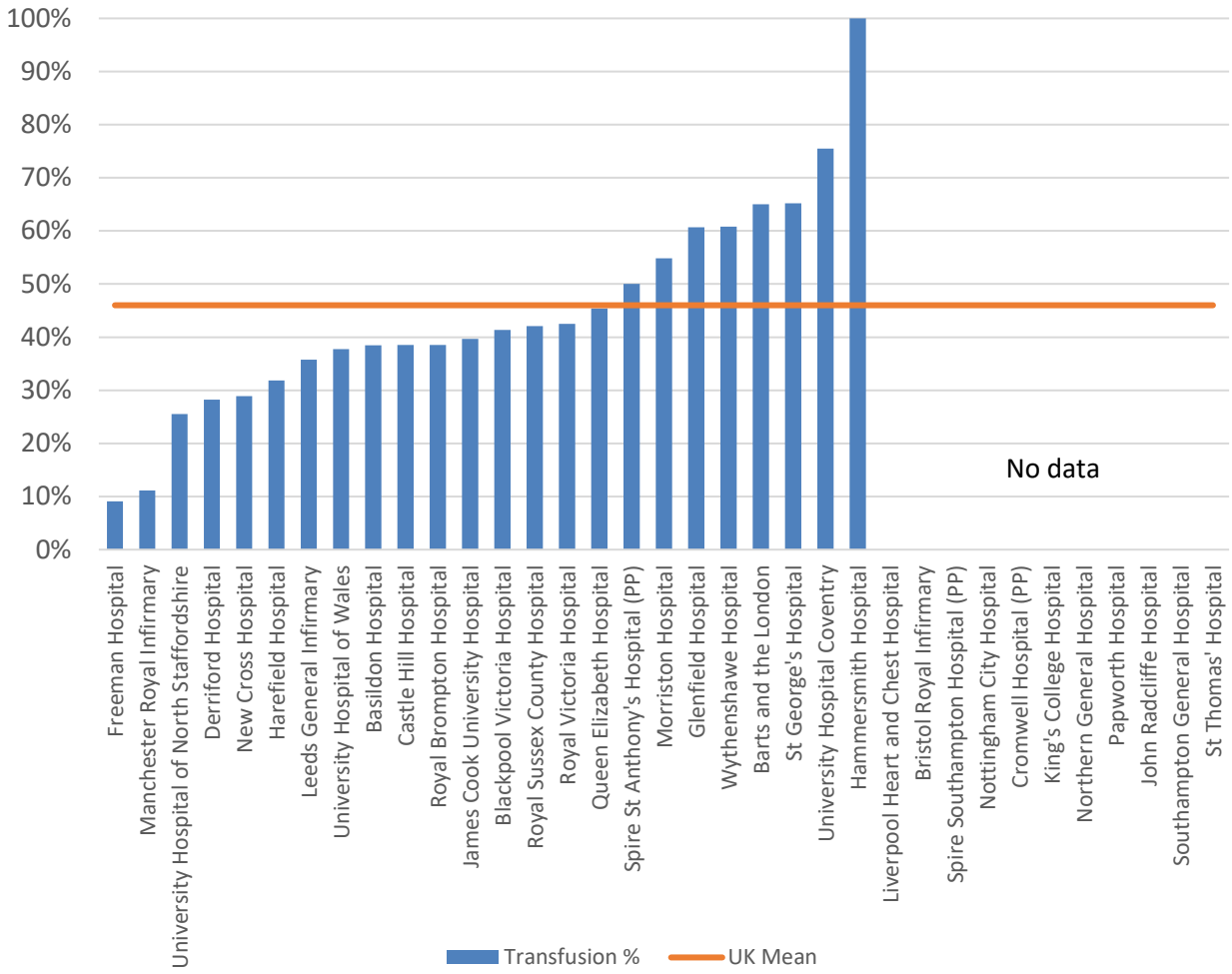


	Yes	No	Data Missing (n)	Missing (%)	Transfusion rate (%)
UK (excluding Scotland)	2839	3327	4787	44%	46%
England	2604	3039	4774	46%	46%
Northern Ireland	68	92	0	0%	43%
Wales	167	196	13	3%	46%

New data field in NACSA last year. Data for one year only (2021/22). Transfusion rate calculated on completed data only (missing data excluded). Transfusion of any type (including red cells, FFP, platelets, cryoprecipitate).

	Yes	No	Data Missing (n)	Missing (%)	Transfusion rate (%)
Spire St Anthony's Hospital (PP)	12	12		0%	50%
Barts and the London	505	272	24	3%	65%
Basildon Hospital	5	8	323	96%	38%
Liverpool Heart and Chest Hospital			745	100%	
Bristol Royal Infirmary			427	100%	
Spire Southampton Hospital (PP)			79	100%	
Castle Hill Hospital	119	190		0%	39%
Nottingham City Hospital			210	100%	
Cromwell Hospital (PP)			3	100%	
Freeman Hospital	2	20	154	88%	9%
St George's Hospital	191	102		0%	65%
Glenfield Hospital	199	129		0%	61%
Hammersmith Hospital	80		176	69%	100%
Harefield Hospital	140	300	25	5%	32%
King's College Hospital			309	100%	
Leeds General Infirmary	94	169	1	0%	36%
Morriston Hospital	96	79		0%	55%
Manchester Royal Infirmary	13	104	156	57%	11%
New Cross Hospital	83	204	123	30%	29%
Northern General Hospital			199	100%	
Royal Brompton Hospital	158	252		0%	39%
Papworth Hospital			544	100%	
Derriford Hospital	83	211		0%	28%
Queen Elizabeth Hospital	44	53	5	5%	45%
John Radcliffe Hospital			319	100%	
Royal Sussex County Hospital	77	106	21	10%	42%
Royal Victoria Hospital	68	92		0%	43%
James Cook University Hospital	175	266		0%	40%
Southampton General Hospital			347	100%	
St Thomas' Hospital			323	100%	
University Hospital of North Staffordshire	48	140	69	27%	26%
University Hospital of Wales	71	117	13	6%	38%
Blackpool Victoria Hospital	247	350	15	2%	41%
University Hospital Coventry	191	62		0%	75%
Wythenshawe Hospital	138	89	177	44%	61%

New data field in NACSA. Data for one year only (2021/22). Transfusion rate calculated on completed data only (missing data excluded). Transfusion of any type (including red cells, FFP, platelets, cryoprecipitate). Red if no data submitted; Green if 100% submitted.



Proportion (%) of Isolated CABG operations receiving a blood transfusion (of any type). Hospitals showing 0% submitted no data. UK Mean transfusion rate 46%. Data for 2021/22 (1 year).

Dual Consultant Operations

Nations	2019/20	2020/21	2021/22	
UK	117	196	229	**Number of DCO cases**
England	117	196	218	
Northern Ireland	0	0	5	
Wales	0	0	6	
UK	0.41	1.04	0.94	**% of total cases**
England	0.44	1.10	0.96	
Northern Ireland	0	0	0.90	
Wales	0	0	0.65	
UK	36	34	47	**Deaths (n)**
England	36	34	45	
Northern Ireland			0	
Wales			2	
UK	30.8	17.3	20.5	**Mortality (%)**
England	30.8	17.3	20.6	
Northern Ireland			0	
Wales			33.3	
UK	27.1	20.0	21.1	**Predicted Mortality % (EuroSCORE Logistic)**
England	27.1	20.0	20.1	
Northern Ireland			33.6	
Wales			46.3	

Dual Consultant Operating (DCO) was a concept introduced to the audit in April 2019. It was introduced to optimise patient care for those undergoing very high-risk procedures and to help to avoid potential risk averse behaviour by surgeons. Any deaths are still reported at Unit level but are excluded when analysing an individual surgeon's outcomes.

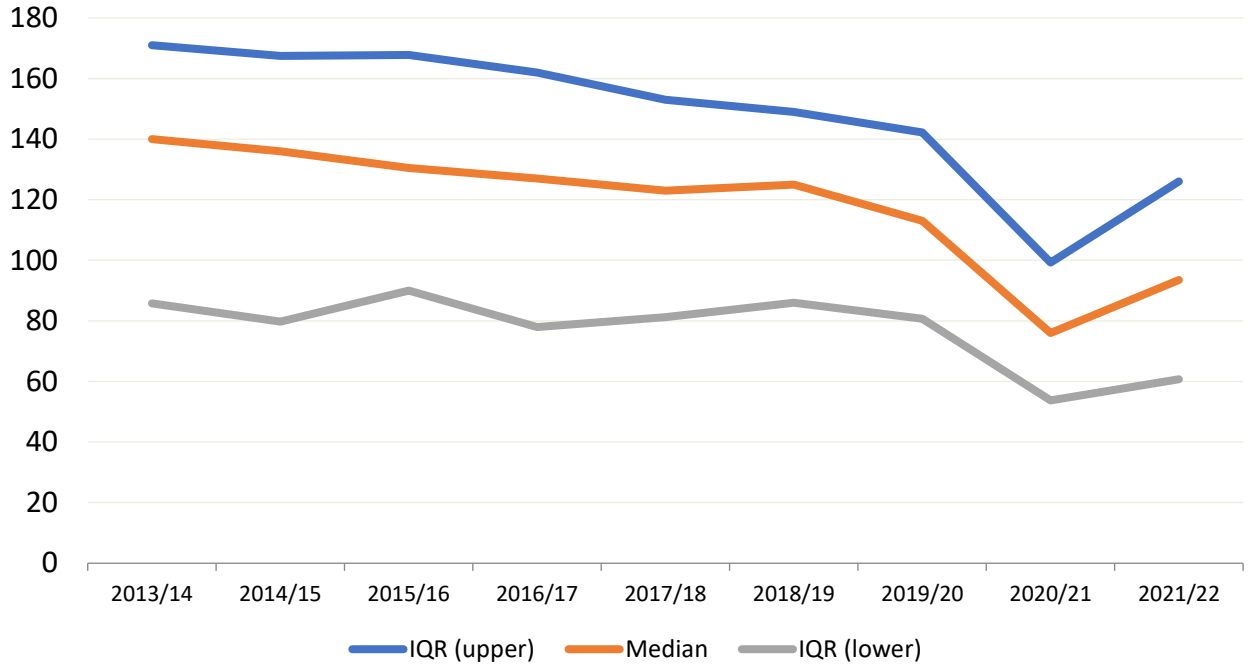
To be recorded as a DCO case a unit must document that a properly constituted MDT has taken place to discuss each patient. Patients may only be prospectively allocated as a DCO case – it cannot be done peri or post operatively. Emergency patients are excluded (as it is not possible to undergo an MDT in these situations, and these cases are already excluded from an individual consultant's outcome analysis).

Hospital	Number of DCO cases	% Total Cases	Deaths (n)	Mortality (%)	Predicted Mortality (%)
Spire St Anthony's Hospital (PP)	3	5.5	0	0	15.1
Barts and the London	14	0.8	3	21.4	18.0
Basildon Hospital	3	0.4	2	66.7	51.2
Liverpool Heart and Chest Hospital	9	0.6	1	11.1	25.2
Bristol Royal Infirmary	3	0.3	0	0	14.4
Spire Southampton Hospital (PP)	0				
Castle Hill Hospital	15	2.7	5	33.3	29.8
Nottingham City Hospital	0				
Cromwell Hospital (PP)	0				
Freeman Hospital	0				
St George's Hospital	0				
Glenfield Hospital	20	2.6	6	30.0	24.9
Hammersmith Hospital	11	2.5	2	18.2	9.3
Harefield Hospital	29	3.2	6	20.7	11.3
King's College Hospital	22	3.2	7	31.8	11.3
Leeds General Infirmary	6	1.0	0	0	21.0
Morriston Hospital	1	0.2	0	0	30.1
Manchester Royal Infirmary	3	0.8	0	0	9.5
New Cross Hospital	2	0.2	1	50.0	55.4
Northern General Hospital	9	1.5	1	11.1	31.8
Royal Brompton Hospital	6	0.6	2	33.3	31.2
Papworth Hospital	6	0.4	2	33.3	23.9
Derriford Hospital	2	0.2	1	50.0	31.2
Queen Elizabeth Hospital	3	1.2	0	0	12.8
John Radcliffe Hospital	7	1.0	1	14.3	24.0
Royal Sussex County Hospital	7	1.5	1	14.3	31.8
Royal Victoria Hospital	5	0.9	0	0	33.6
James Cook University Hospital	6	0.8	0	0	16.0
Southampton General Hospital	0				
St Thomas' Hospital	0				
University Hospital of North	5	1.0	2	40.0	20.9
University Hospital of Wales	5	1.0	2	40.0	49.5
Blackpool Victoria Hospital	4	0.4	0	0	33.3
University Hospital Coventry	18	3.7	1	5.6	13.5
Wythenshawe Hospital	5	0.5	1	20.0	19.5

Data for last year only (2021/22) – for previous years see previous reports. Predicted mortality calculated using EuroSCORE logistic %. PP private hospital.

Consultant caseloads and Surgical Training

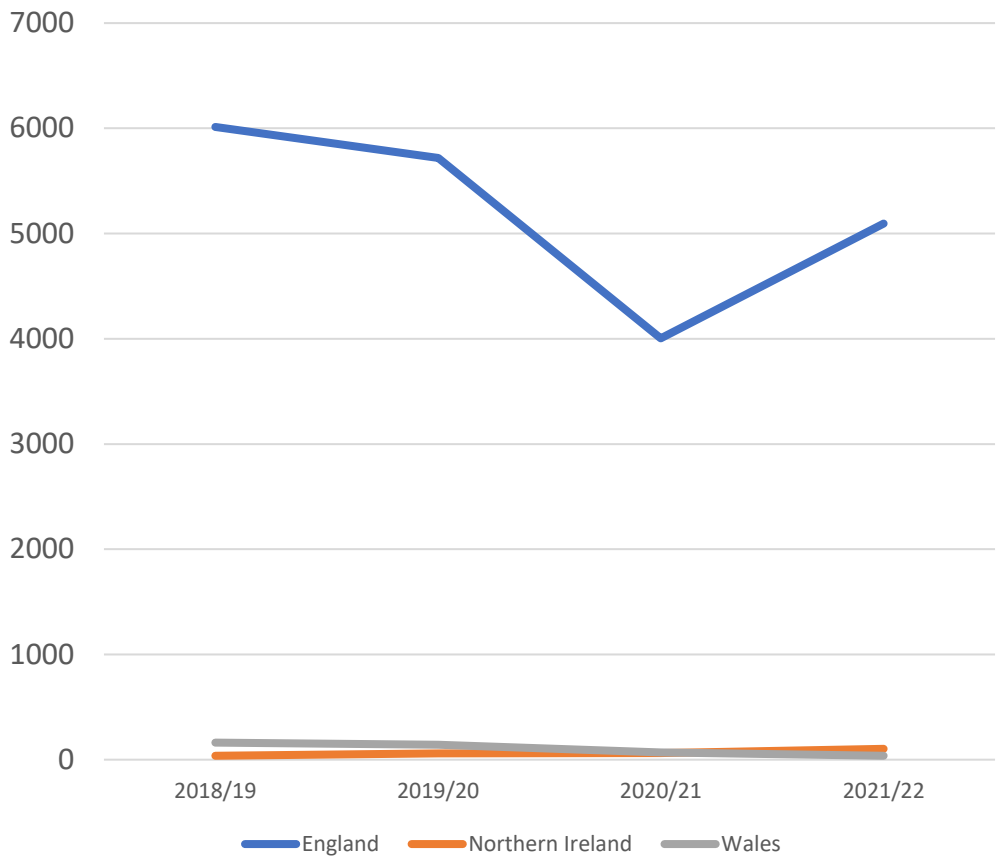
Numbers of cardiac operations performed each year per consultant – UK



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Consultant Surgeons (UK excl Scotland)	252	260	250	263	262	265	264	256	268
Surgeons performing >33 cases/yr	231	232	225	233	234	230	236	219	226
Mean (cases/yr)	131.1	126.9	128.9	122.4	119.0	115.8	112.0	75.7	92.6
IQR (upper)	171	168	168	162	153	149	142	99	126
Median (cases/yr)	140	136	130.5	127	123	125	113	76	94
IQR (lower)	86	80	90	78	81	86	81	54	60.75

Counts here include all cases (including emergencies) for which each consultant is responsible. It excludes Dual Consultant (DCO) cases. Counts here are higher than for the Clinical Outcomes Publication (COP) which excludes emergencies from the analysis. Analysis of surgeon outcomes within COP requires >99 cases in 3 years. Since Covid, individual surgeon outcomes have not been published by NICOR, however the data is still fed back by NICOR and SCTS to individual units.

Number of cardiac operations performed by surgeon other than consultant (trainees) in UK (2018/19 to 2021/22)

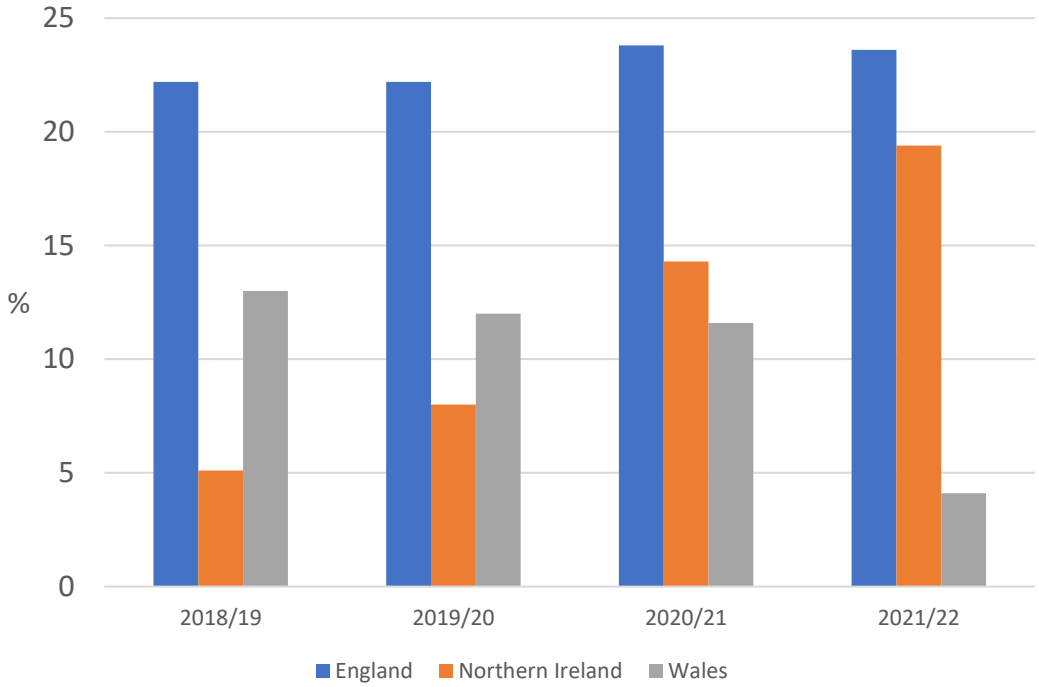


Nation	Trainee cases (n)			
	2018/19	**2019/20**	**2020/21**	**2021/22**
England	6013	5717	4004	5094
Northern Ireland	37	61	62	103
Wales	162	142	69	37

Trainee case defined within the data as 'First Operator' GMC number not the same as 'Responsible Consultant' GMC number. This will include both registrars with a national training number (NTN) and Trust Fellows etc. In some hospitals it will also include post-CCT/CESR doctors who are fully trained, but not working as consultants.

The GMC number of the Consultant responsible for the case is an obligatory field within the dataset. Cases where no GMC number has been recorded for the First Operator are excluded from these counts. (Data on the count/% of missing data is contained in hospital level table below).

Proportion (%) of cardiac operations performed by surgeon other than consultant (trainees) in UK



Nation	Trainee cases (%)			
	2018/19	**2019/20**	**2020/21**	**2021/22**
England	22.2	22.2	23.8	23.6
Northern Ireland	5.1	8	14.3	19.4
Wales	13	12	11.6	4.1

Number and proportion (%) of cardiac operations performed by consultant – by hospital

Hospital	Total Cases	First Operator Blank	First Operator Blank (%)	Total by Consultant	Case by Consultant (%)
Spire St Anthony's Hospital	125	0	0	125	100
University Hospital of Wales	1461	9	0.6	1405	96.2
Leeds General Infirmary	1937	9	0.5	1852	95.6
Manchester Royal Infirmary	1290	1	0.1	1201	93.1
University Hospital Coventry	1333	1	0.1	1188	89.1
St George's Hospital	1463	177	12.1	1261	86.2
Liverpool Heart and Chest	4302	63	1.5	3704	86.1
Nottingham City Hospital	1363	0	0	1145	84
University Hospital of North	1488	2	0.1	1246	83.7
Cromwell Hospital (PP)	47	8	17	39	83
Harefield Hospital	2706	95	3.5	2246	83
Royal Victoria Hospital	1730	83	4.8	1421	82.1
Northern General Hospital	1939	3	0.2	1588	81.9
St Thomas' Hospital	2316	2	0.1	1890	81.6
Wythenshawe Hospital	2258	9	0.4	1834	81.2
Morriston Hospital	1212	35	2.9	976	80.5
Royal Sussex County Hospital	1330	0	0	1034	77.7
James Cook University	2235	0	0	1711	76.6
Basildon Hospital	1777	0	0	1356	76.3
King's College Hospital	1752	30	1.7	1335	76.2
Blackpool Victoria Hospital	2699	17	0.6	2045	75.8
Glenfield Hospital	2145	0	0	1607	74.9
New Cross Hospital	2094	0	0	1566	74.8
Derriford Hospital	2589	249	9.6	1918	74.1
Spire Southampton Hospital	1001	262	26.2	739	73.8
Royal Brompton Hospital	2367	4	0.2	1662	70.2
Castle Hill Hospital	1749	1	0.1	1208	69.1
Papworth Hospital	3899	5	0.1	2421	62.1
Queen Elizabeth Hospital	1101	3	0.3	663	60.2
Barts and the London	4737	10	0.2	2760	58.3
Freeman Hospital	1542	13	0.8	889	57.7
John Radcliffe Hospital	1727	148	8.6	995	57.6
Southampton General	2665	310	11.6	1293	48.5
Hammersmith Hospital	1345	4	0.3	559	41.6
Bristol Royal Infirmary	2888	2888	100	0	0
Mater Misericordiae Hospital	1010	1010	100	0	0

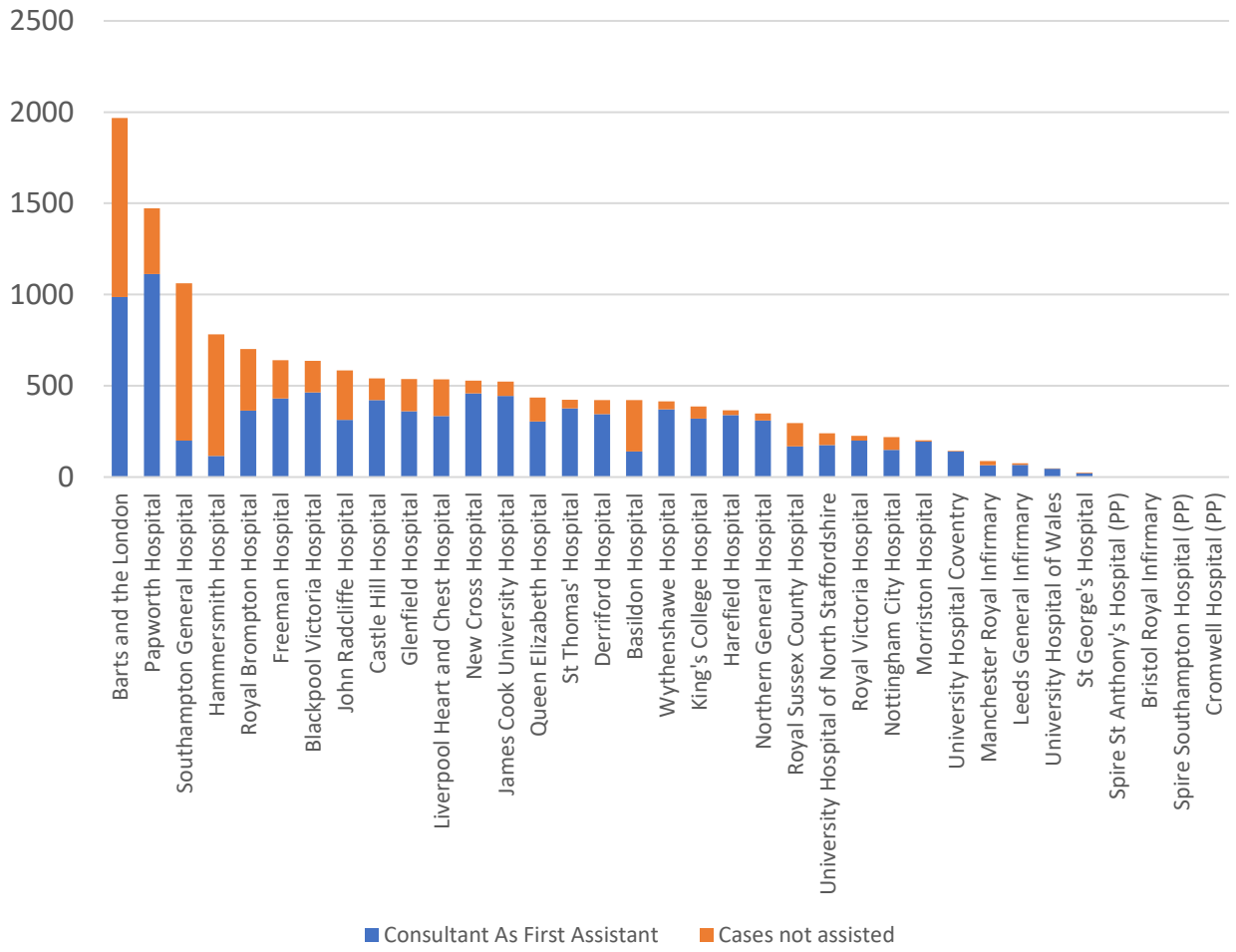
Aggregate data for 3 years - 2019/22. (Defined as First Operator GMC number the same as Responsible Consultant GMC number). Ranked by highest proportion performed (%).

Number and proportion (%) of cardiac operations performed by a surgeon other than consultant surgeons (trainees) – by hospital

Hospital	Total Cases	Total Cases by Trainee	Cases by Trainee (%)	Trainee Cases with Consultant As	% Trainee cases supervised by Consulta
Barts and the London	4737	1967	41.5	987	50.2%
Papworth Hospital	3899	1473	37.8	1112	75.5%
Southampton General Hospital	2665	1062	39.8	199	18.7%
Hammersmith Hospital	1345	782	58.1	115	14.7%
Royal Brompton Hospital	2367	701	29.6	364	51.9%
Freeman Hospital	1542	640	41.5	431	67.3%
Blackpool Victoria Hospital	2699	637	23.6	464	72.8%
John Radcliffe Hospital	1727	584	33.8	314	53.8%
Castle Hill Hospital	1749	540	30.9	421	78.0%
Glenfield Hospital	2145	538	25.1	360	66.9%
Liverpool Heart and Chest Hospital	4302	535	12.4	335	62.6%
New Cross Hospital	2094	528	25.2	459	86.9%
James Cook University Hospital	2235	524	23.4	444	84.7%
Queen Elizabeth Hospital	1101	435	39.5	305	70.1%
St Thomas' Hospital	2316	424	18.3	377	88.9%
Derriford Hospital	2589	422	16.3	344	81.5%
Basildon Hospital	1777	421	23.7	141	33.5%
Wythenshawe Hospital	2258	415	18.4	371	89.4%
King's College Hospital	1752	387	22.1	321	82.9%
Harefield Hospital	2706	365	13.5	339	92.9%
Northern General Hospital	1939	348	17.9	309	88.8%
Royal Sussex County Hospital	1330	296	22.3	169	57.1%
University Hospital of North	1488	240	16.1	175	72.9%
Royal Victoria Hospital	1730	226	13.1	200	88.5%
Nottingham City Hospital	1363	218	16	149	68.3%
Morriston Hospital	1212	201	16.6	194	96.5%
University Hospital Coventry	1333	144	10.8	140	97.2%
Manchester Royal Infirmary	1290	88	6.8	65	73.9%
Leeds General Infirmary	1937	76	3.9	67	88.2%
University Hospital of Wales	1461	47	3.2	45	95.7%
St George's Hospital	1463	25	1.7	22	88.0%
Spire St Anthony's Hospital (PP)	125	0	0	0	
Bristol Royal Infirmary	2888	0*	0	0	NA
Spire Southampton Hospital (PP)	1001	0	0	0	
Cromwell Hospital (PP)	47	0	0	0	
Mater Misericordiae Hospital	1010	0*	0	0	NA

Aggregate data for 3 years - 2019/22. (Trainee defined as 'First Operator' GMC number not the same as 'Responsible Consultant' GMC number. This will include both national trainees (NTN) and Trust Fellows etc. In some hospitals this will include post-CCT/CESR doctors not in consultant posts). Ranked by highest total cases performed by trainee.

(No GMC number recorded for First Operator)*

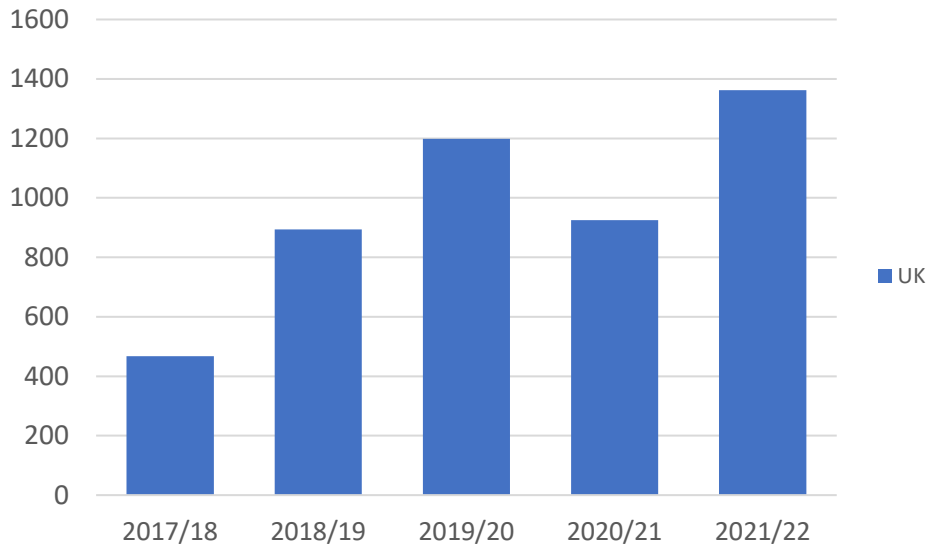


Cases performed by a surgeon other than the Responsible Consultant for the case. Aggregate data for three years 2019/22.

Left Atrial Appendage Occlusion as a concomitant procedure during cardiac surgery

The LAAOS III trial was reported in 2021 showing that patients with pre-operative atrial fibrillation that underwent concomitant surgical occlusion of the left atrial appendage at the same time as undergoing cardiac surgery were at a reduced risk of subsequent stroke or systemic embolus[2]. The patients in the trial were recruited across 27 countries (including the UK) between 2012 and 2018, with a mean duration of follow up of 3.8 years. The results were reported in 2021. The data presented below seeks to assess the influence on UK practice.

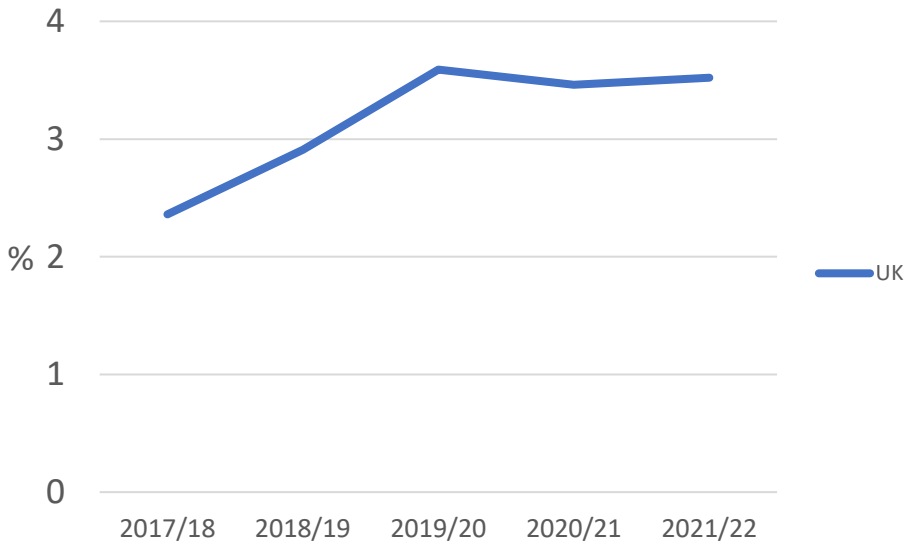
Trends in Left Atrial Appendage Occlusion rates – procedure numbers (by UK and nation)



Nation	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	467	894	1199	925	1362
England	427	846	1125	869	1245
Northern Ireland	3	5	6	2	23
Republic of Ireland	31	32	28	39	39
Wales	6	11	40	15	55

Numbers are for isolated Left Atrial Appendage Occlusion and/or for patients undergoing a surgical Maze procedure where LA occlusion also documented.

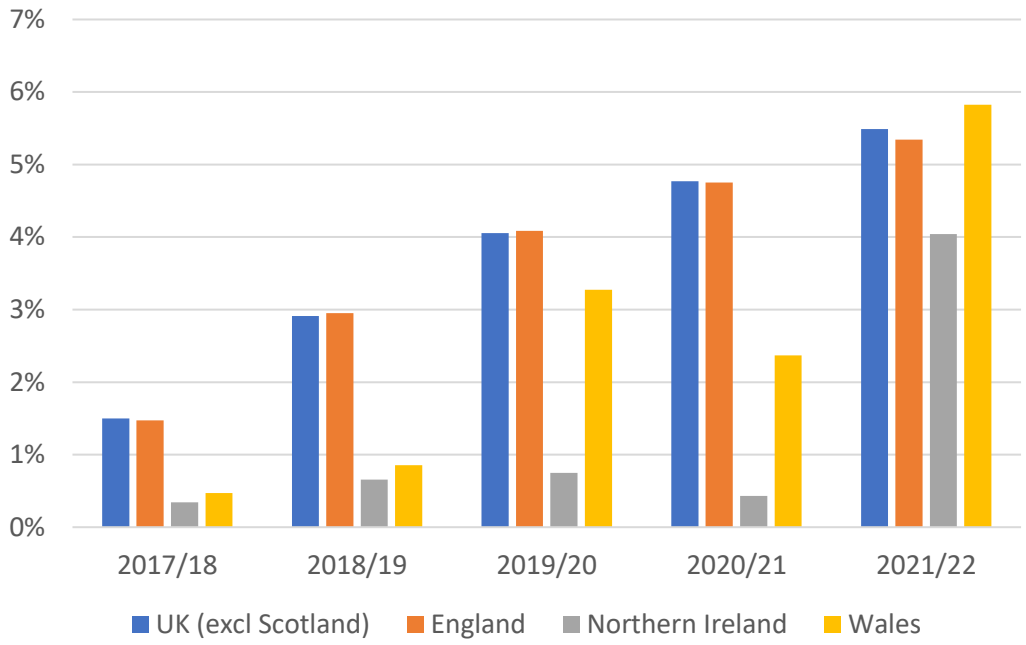
Crude mortality rate (%) in patients undergoing Left Atrial Occlusion as a concomitant procedure – UK and nation (by year)



Nation	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excluding Scotland)	2.4	2.9	3.6	3.5	3.5
England	1.9	3.1	3.6	3.6	3.4
Northern Ireland	33.3*	0	0	0	0
Republic of Ireland	6.5	0	3.6	0	5.1
Wales	0	0	2.5	6.7	7.3

It is unlikely that Left Atrial Occlusion will influence in-hospital (i.e. post-operative) mortality rates. The rates in this table will reflect the surgical risk and the mortality rate of the main procedure being performed at the time. (very few procedures performed).*

Trends in the proportion (%) of patients receiving concomitant Left Atrial Occlusion at the time of cardiac surgery – (UK and nation)



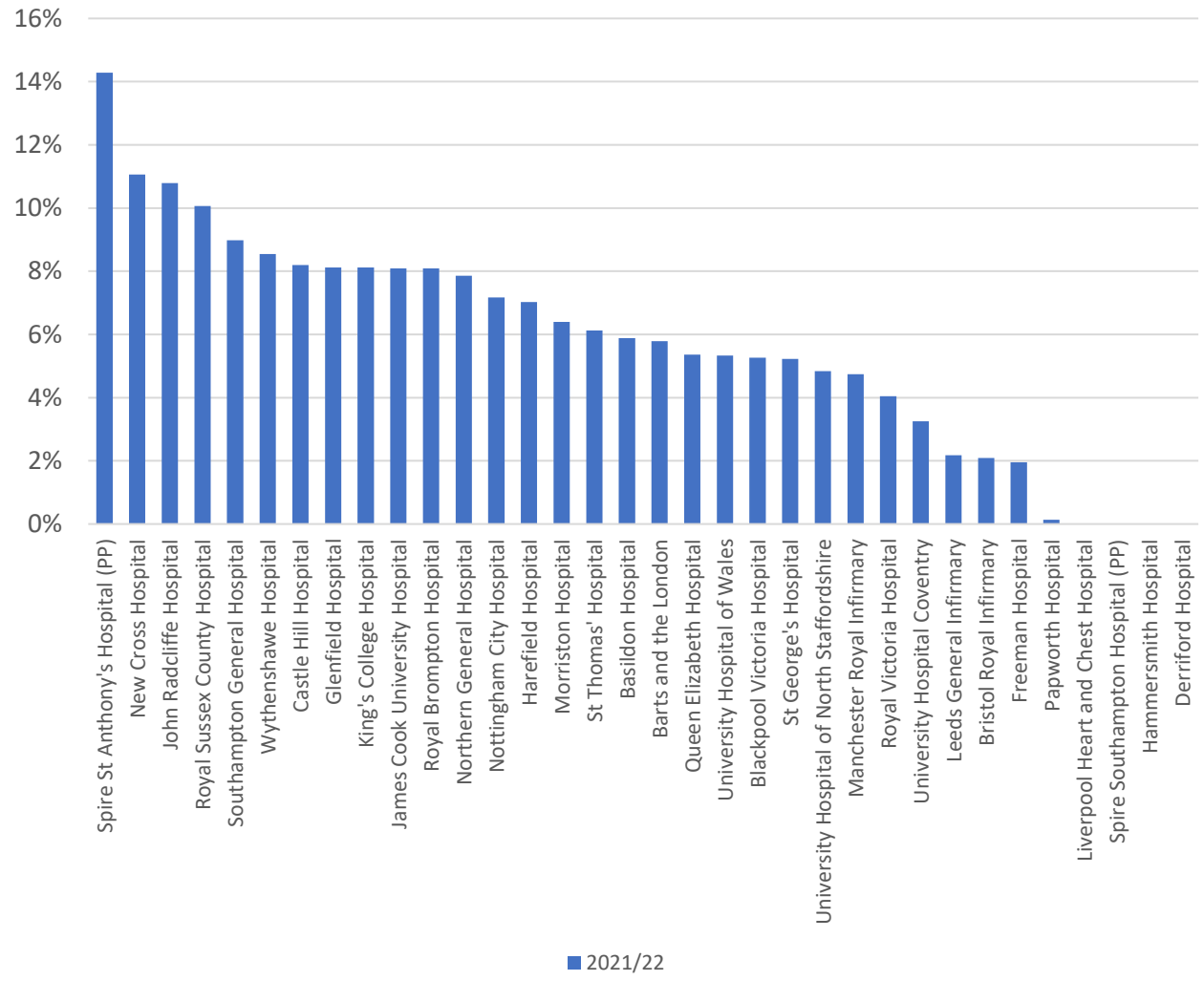
Nation	2017/18	2018/19	2019/20	2020/21	2021/22
UK (excl Scotland)	1.5%	2.9%	4.1%	4.8%	5.5%
England	1.5%	3.0%	4.1%	4.8%	5.3%
Northern Ireland	0.3%	0.7%	0.7%	0.4%	4.0%
Wales	0.5%	0.9%	3.3%	2.4%	5.8%

Proportion of all cardiac procedures (irrespective of whether have preoperative atrial fibrillation).

Proportion (%) of patients undergoing concomitant Left Atrial Occlusion - by unit (2017/2022)

Hospital	2017/18	2018/19	2019/20	2020/21	2021/22
Spire St Anthony's Hospital (PP)	10.2%	8.0%	10.2%	15.4%	14.3%
New Cross Hospital	4.2%	7.2%	7.3%	9.0%	11.1%
John Radcliffe Hospital	1.3%	0.8%	3.0%	8.9%	10.8%
Royal Sussex County Hospital	0.0%	0.0%	0.2%	10.4%	10.1%
Southampton General Hospital	4.2%	7.7%	7.4%	8.4%	9.0%
Wythenshawe Hospital	0.0%	0.0%	3.8%	7.1%	8.5%
Castle Hill Hospital	0.0%	6.1%	7.6%	7.1%	8.2%
Glenfield Hospital	1.6%	4.8%	6.4%	8.3%	8.1%
King's College Hospital	0.6%	7.0%	7.6%	8.0%	8.1%
James Cook University Hospital	2.9%	3.6%	3.8%	4.6%	8.1%
Royal Brompton Hospital	0.0%	5.7%	6.8%	5.7%	8.1%
Northern General Hospital	5.1%	5.1%	8.9%	6.4%	7.9%
Nottingham City Hospital	2.8%	6.2%	8.2%	10.0%	7.2%
Harefield Hospital	0.0%	7.0%	5.3%	5.2%	7.0%
Morriston Hospital	0.9%	0.6%	1.4%	2.2%	6.4%
St Thomas' Hospital	0.0%	1.4%	5.9%	6.4%	6.1%
Basildon Hospital	0.0%	3.3%	5.3%	7.7%	5.9%
Barts and the London	2.4%	4.0%	6.5%	6.2%	5.8%
Queen Elizabeth Hospital	3.2%	5.2%	5.7%	5.6%	5.4%
University Hospital of Wales	0.0%	1.1%	4.9%	2.5%	5.3%
Blackpool Victoria Hospital	0.3%	2.9%	1.6%	4.7%	5.3%
St George's Hospital	9.1%	5.6%	6.6%	7.8%	5.2%
University Hospital of North Staffordshire	0.0%	1.1%	1.9%	3.6%	4.8%
Manchester Royal Infirmary	0.4%	1.8%	6.3%	6.6%	4.7%
Royal Victoria Hospital	0.3%	0.7%	0.7%	0.4%	4.0%
University Hospital Coventry	0.0%	0.0%	0.0%	0.0%	3.3%
Leeds General Infirmary	0.0%	0.0%	1.2%	2.4%	2.2%
Bristol Royal Infirmary	0.0%	0.0%	0.4%	0.6%	2.1%
Freeman Hospital	3.2%	4.3%	3.3%	2.4%	2.0%
Papworth Hospital	0.0%	0.0%	2.1%	0.0%	0.1%
Liverpool Heart and Chest Hospital	0.0%	0.0%	0.0%	0.0%	0.0%
Spire Southampton Hospital (PP)	0.0%	0.0%	0.0%	0.0%	0.0%
Hammersmith Hospital	0.0%	0.0%	0.0%	0.0%	0.0%
Derriford Hospital	0.0%	0.0%	0.0%	0.0%	0.0%

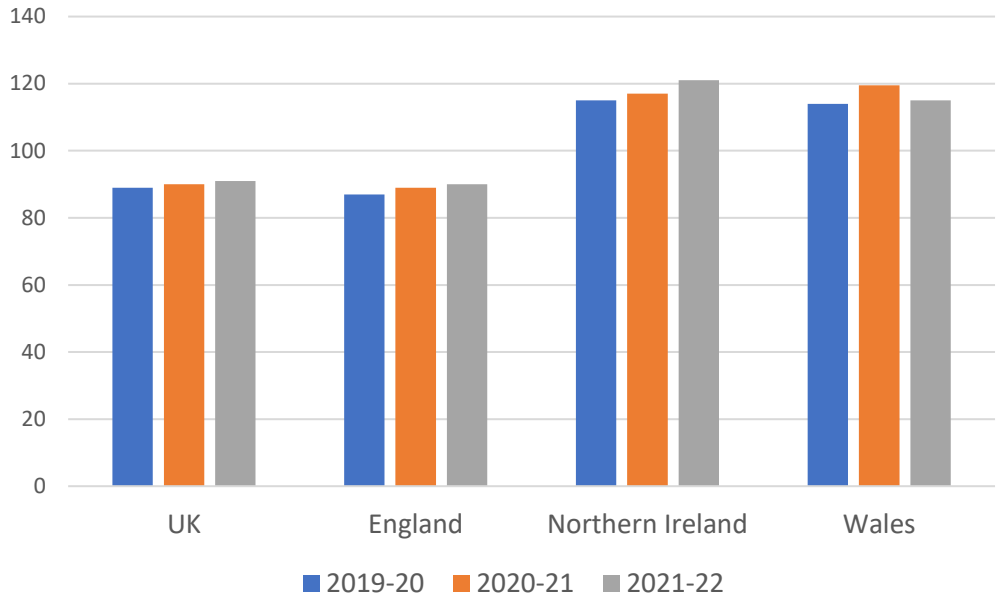
Ranked by rate in 2021/22



Proportion of patients having concomitant Left Atrial Appendage occlusion. UK mean in 2021/22 was 5.5%

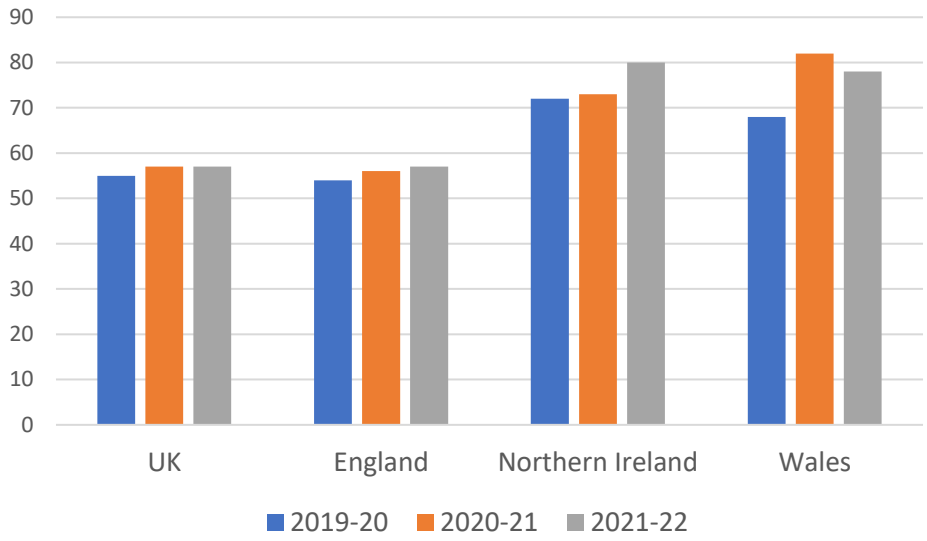
Operation times (Bypass and Crossclamp)

Mean Cardiopulmonary Bypass time (minutes) for isolated CABG



Nations	2019/20	2020/21	2021/22
UK	89	90	91
England	87	89	90
Northern Ireland	115	117	121
Wales	114	120	115

Mean Aortic Crossclamp time (minutes) for isolated CABG

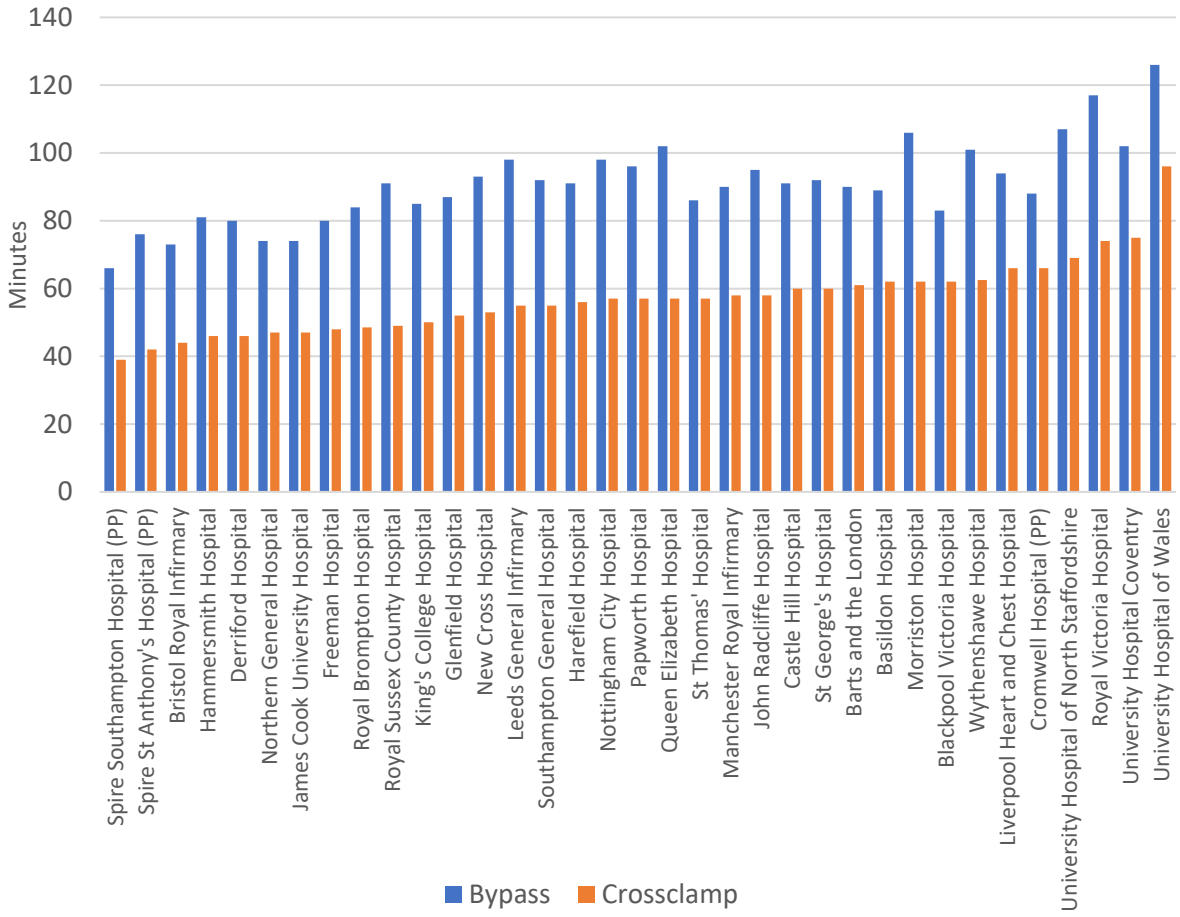


Nations	2019/20	2020/21	2021/22
UK	55	57	57
England	54	56	57
Northern Ireland	72	73	80
Wales	68	82	78

Mean Bypass and Crossclamp times for isolated CABG – by hospital

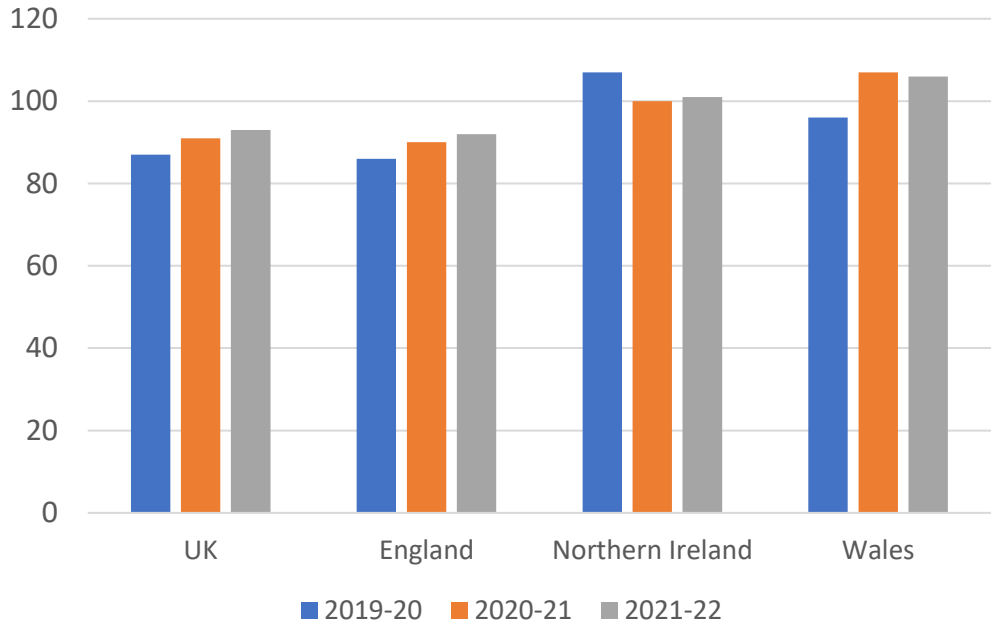
Hospital	Bypass (minutes)	Crossclamp (minutes)
Spire Southampton Hospital (PP)	66	39
Spire St Anthony's Hospital (PP)	76	42
Bristol Royal Infirmary	73	44
Hammersmith Hospital	81	46
Derriford Hospital	80	46
Northern General Hospital	74	47
James Cook University Hospital	74	47
Freeman Hospital	80	48
Royal Brompton Hospital	84	48.5
Royal Sussex County Hospital	91	49
King's College Hospital	85	50
Glenfield Hospital	87	52
New Cross Hospital	93	53
Leeds General Infirmary	98	55
Southampton General Hospital	92	55
Harefield Hospital	91	56
Nottingham City Hospital	98	57
Papworth Hospital	96	57
Queen Elizabeth Hospital	102	57
St Thomas' Hospital	86	57
Manchester Royal Infirmary	90	58
John Radcliffe Hospital	95	58
Castle Hill Hospital	91	60
St George's Hospital	92	60
Barts and the London	90	61
Basildon Hospital	89	62
Morriston Hospital	106	62
Blackpool Victoria Hospital	83	62
Wythenshawe Hospital	101	62.5
Liverpool Heart and Chest Hospital	94	66
Cromwell Hospital (PP)	88	66
University Hospital of North Staffordshire	107	69
Royal Victoria Hospital	117	74
University Hospital Coventry	102	75
University Hospital of Wales	126	96

Three-year combined data 2019/22. Ranked by crossclamp time. PP private hospital.



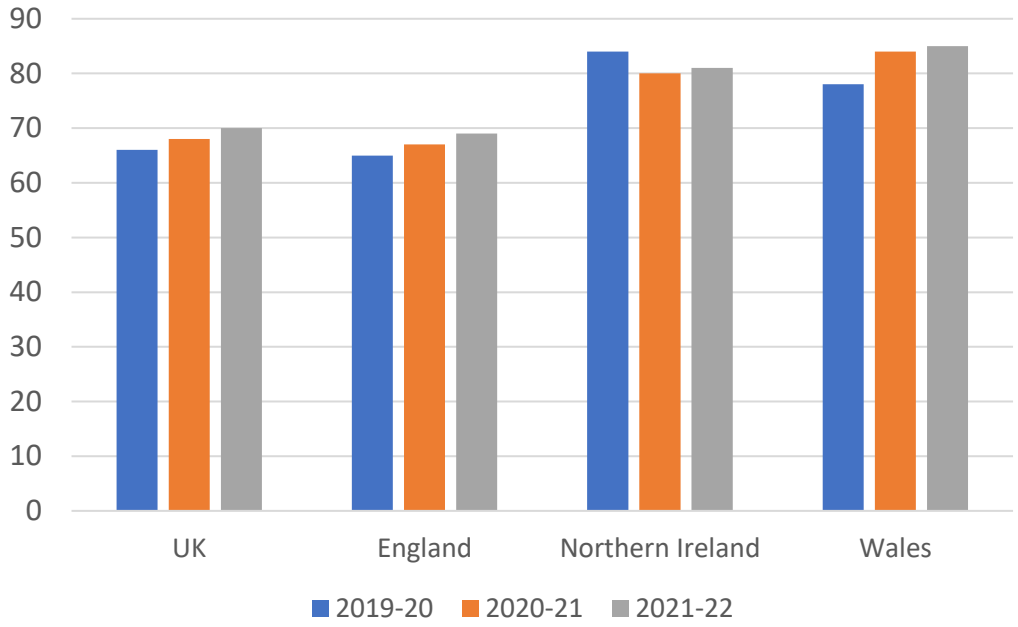
Isolated CABG mean Bypass and Crossclamp times (minutes). Ranked by Crossclamp time. Combined three-year data for 2019/22.

Mean Cardiopulmonary Bypass time (minutes) for isolated AVR



Nations	2019/20	2020/21	2021/22
UK	87	91	93
England	86	90	92
Northern Ireland	107	100	101
Wales	96	107	106

Mean Aortic Crossclamp time (minutes) for isolated AVR

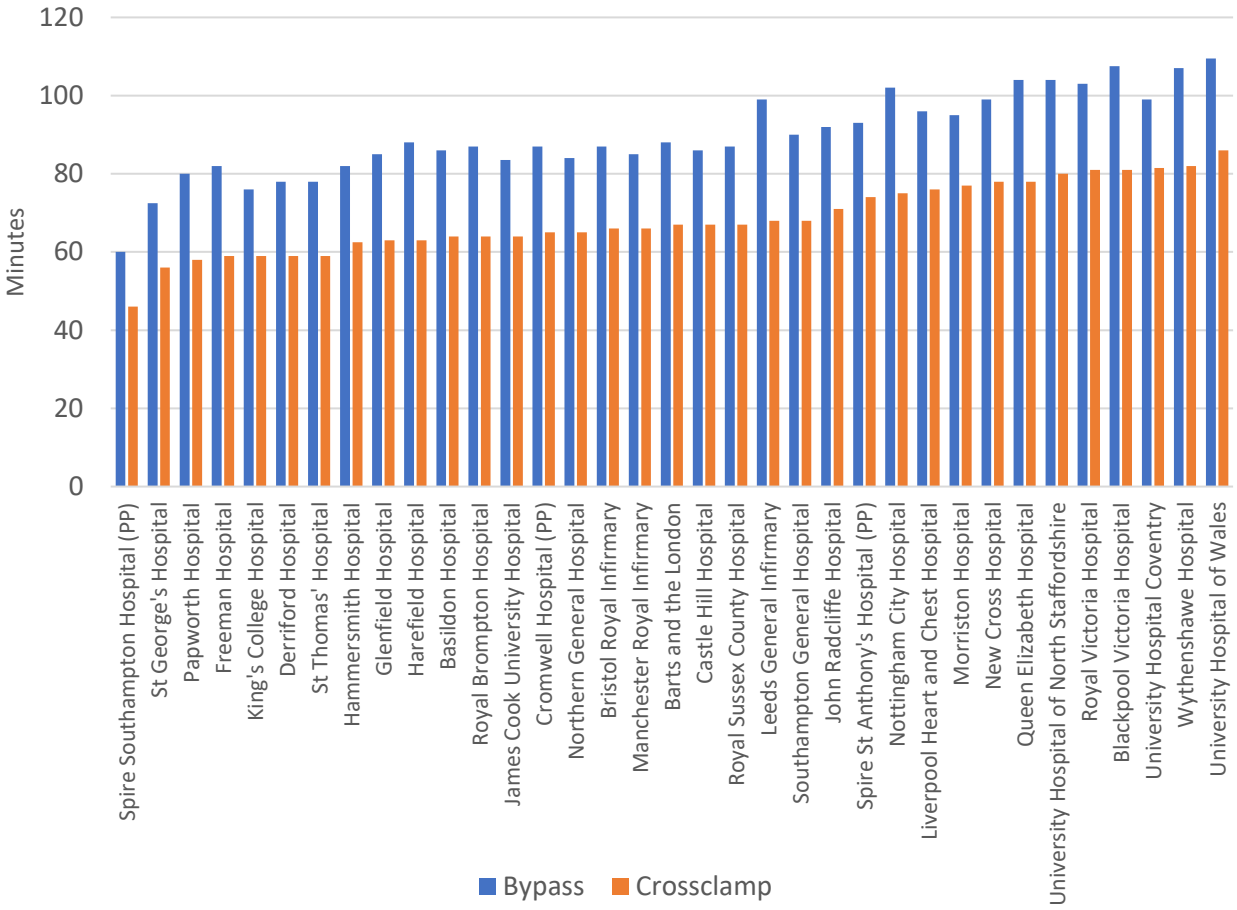


Nations	2019/20	2020/21	2021/22
UK	66	68	70
England	65	67	69
Northern Ireland	84	80	81
Wales	78	84	85

Mean Bypass and Crossclamp times (minutes) for isolated AVR – by hospital

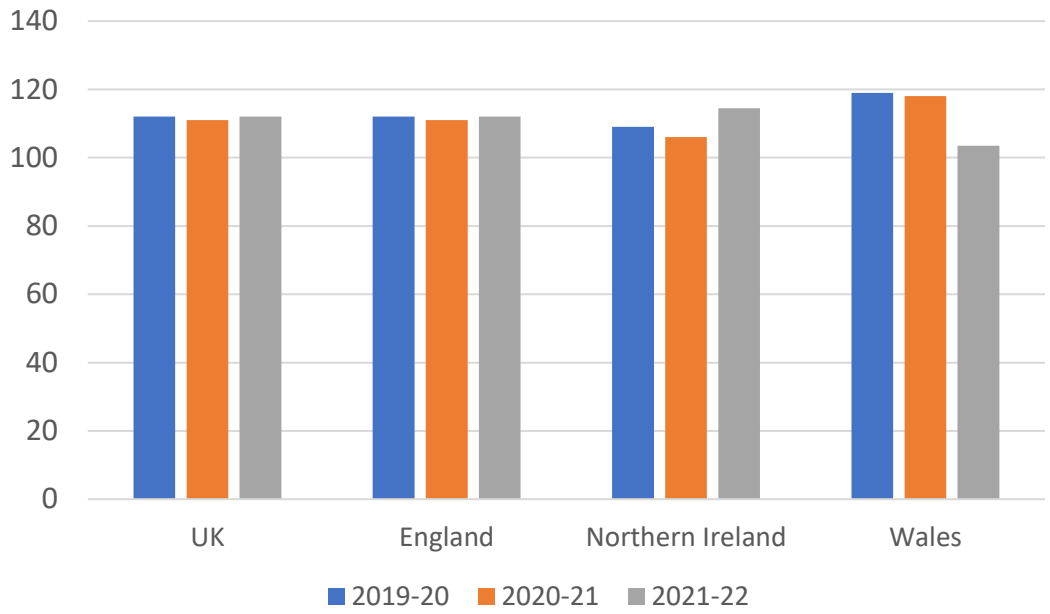
Hospital	Bypass	Crossclamp
Spire Southampton Hospital (PP)	60	46
St George's Hospital	73	56
Papworth Hospital	80	58
Freeman Hospital	82	59
King's College Hospital	76	59
Derriford Hospital	78	59
St Thomas' Hospital	78	59
Hammersmith Hospital	82	63
Glenfield Hospital	85	63
Harefield Hospital	88	63
Basildon Hospital	86	64
Royal Brompton Hospital	87	64
James Cook University Hospital	84	64
Cromwell Hospital (PP)	87	65
Northern General Hospital	84	65
Bristol Royal Infirmary	87	66
Manchester Royal Infirmary	85	66
Barts and the London	88	67
Castle Hill Hospital	86	67
Royal Sussex County Hospital	87	67
Leeds General Infirmary	99	68
Southampton General Hospital	90	68
John Radcliffe Hospital	92	71
Spire St Anthony's Hospital (PP)	93	74
Nottingham City Hospital	102	75
Liverpool Heart and Chest Hospital	96	76
Morriston Hospital	95	77
New Cross Hospital	99	78
Queen Elizabeth Hospital	104	78
University Hospital of North Staffordshire	104	80
Royal Victoria Hospital	103	81
Blackpool Victoria Hospital	108	81
University Hospital Coventry	99	82
Wythenshawe Hospital	107	82
University Hospital of Wales	110	86

Three-year combined data 2019/22. Ranked by crossclamp time. PP private hospital.



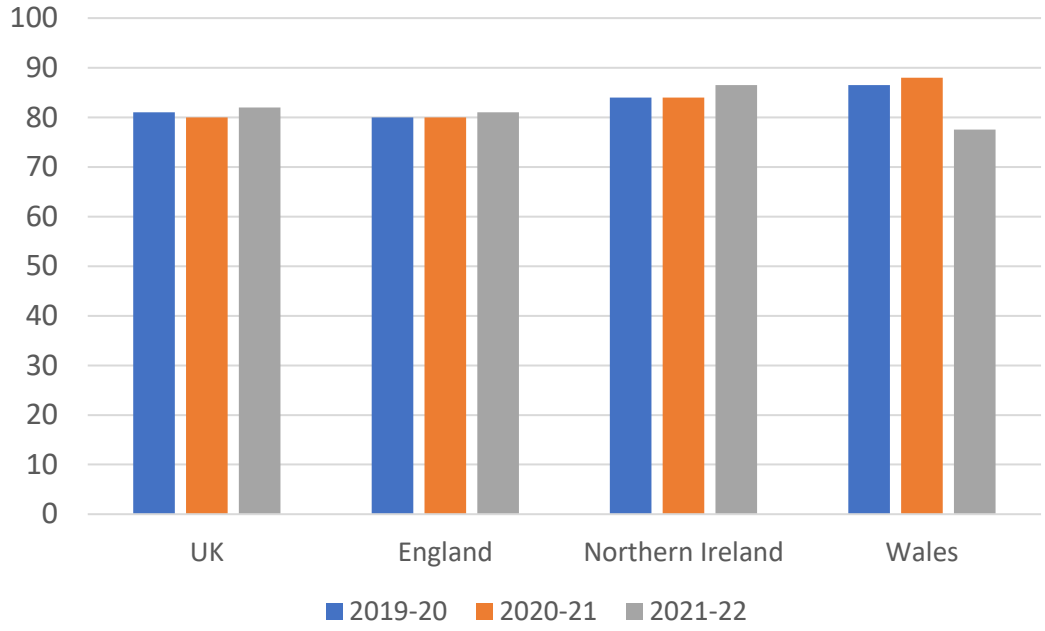
Isolated AVR mean Bypass and Crossclamp times (minutes). Combined three-year data for 2019/22.

Mean Cardiopulmonary Bypass time (minutes) for isolated Mitral surgery (repair or replacement)



Nations	2019/20	2020/21	2021/22
UK	112	111	112
England	112	111	112
Northern Ireland	109	106	115
Wales	119	118	104

Mean Aortic Crossclamp time (minutes) for isolated Mitral surgery (repair or replacement)

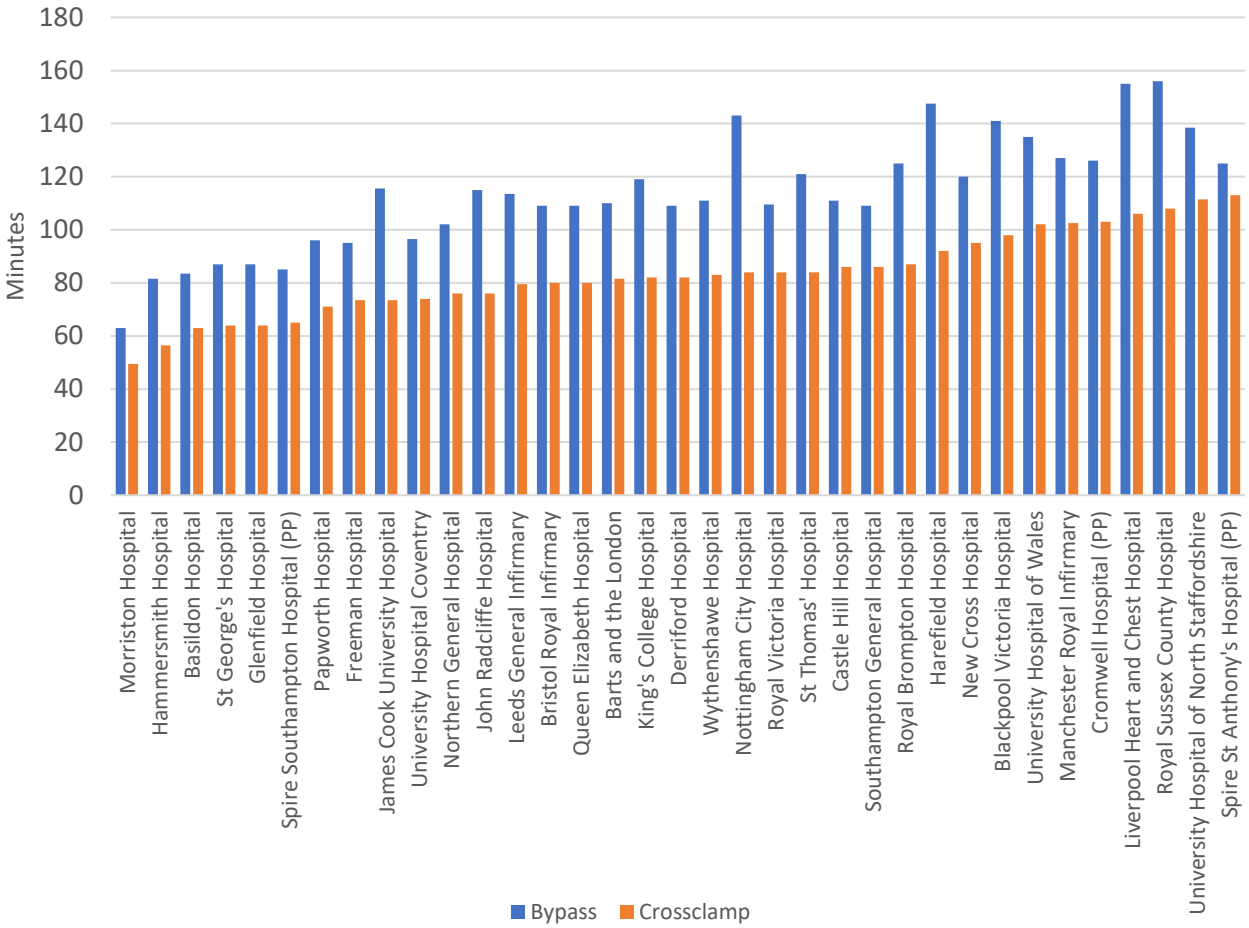


Nations	2019/20	2020/21	2021/22
UK	81	80	82
England	80	80	81
Northern Ireland	84	84	87
Wales	87	88	78

Mean Bypass and Crossclamp times (minutes) for isolated Mitral surgery (repair or replacement) – by hospital

Hospital	Bypass	Crossclamp
Morriston Hospital	63	50
Hammersmith Hospital	82	57
Basildon Hospital	84	63
St George's Hospital	87	64
Glenfield Hospital	87	64
Spire Southampton Hospital (PP)	85	65
Papworth Hospital	96	71
Freeman Hospital	95	74
James Cook University Hospital	116	74
University Hospital Coventry	97	74
Northern General Hospital	102	76
John Radcliffe Hospital	115	76
Leeds General Infirmary	114	80
Bristol Royal Infirmary	109	80
Queen Elizabeth Hospital	109	80
Barts and the London	110	82
King's College Hospital	119	82
Derriford Hospital	109	82
Wythenshawe Hospital	111	83
Nottingham City Hospital	143	84
Royal Victoria Hospital	110	84
St Thomas' Hospital	121	84
Castle Hill Hospital	111	86
Southampton General Hospital	109	86
Royal Brompton Hospital	125	87
Harefield Hospital	148	92
New Cross Hospital	120	95
Blackpool Victoria Hospital	141	98
University Hospital of Wales	135	102
Manchester Royal Infirmary	127	103
Cromwell Hospital (PP)	126	103
Liverpool Heart and Chest Hospital	155	106
Royal Sussex County Hospital	156	108
University Hospital of North Staffordshire	139	112
Spire St Anthony's Hospital (PP)	125	113

Three-year combined data 2019/22. Ranked by crossclamp time. PP private hospital.



Isolated MV surgery mean Bypass and Crossclamp times (minutes). Combined three-year data for 2019/22.

Appendix

NICOR Hospital Codes

ANT. Spire St Anthony's Hospital (PP)
BAL. Barts and the London
BAS. Basildon Hospital
BHL. Liverpool Heart and Chest Hospital
BRI. Bristol Royal Infirmary
CBS. Spire Southampton Hospital (PP)
CHH. Castle Hill Hospital
CHN. Nottingham City Hospital
CRO. Cromwell Hospital (PP)
ERI. Royal Infirmary of Edinburgh
FRE. Freeman Hospital
GEO. St George's Hospital
GJH. Golden Jubilee Hospital
GRL. Glenfield Hospital
HAM. Hammersmith Hospital
HH. Harefield Hospital
HHW. Wellington Hospital North (PP)
HSC. Harley Street Clinic (PP)
KCH. King's College Hospital
LBH. London Bridge Hospital (PP)
LGI. Leeds General Infirmary
MOR. Morriston Hospital
MRI. Manchester Royal Infirmary
NCR. New Cross Hospital
NGS. Northern General Hospital
NHB. Royal Brompton Hospital
PAP. Papworth Hospital
PLY. Derriford Hospital
QEB. Queen Elizabeth Hospital
QEP. Queen Elizabeth Hospital (private) (PP)
RAD. John Radcliffe Hospital
RIA. Aberdeen Royal Infirmary
RSC. Royal Sussex County Hospital
RVB. Royal Victoria Hospital
SCM. James Cook University Hospital
SGH. Southampton General Hospital
STH. St Thomas' Hospital
STO. University Hospital of North Staffordshire
UCL. University College Hospital
UHW. University Hospital of Wales
VIC. Blackpool Victoria Hospital
WAL. University Hospital Coventry
WYT. Wythenshawe Hospital

PP Private (Patient) Hospitals

Abbreviations used in the report

AVR	Aortic valve replacement
BCIS	British Cardiovascular Intervention Society
BCS	British Cardiac Society
CABG	Coronary artery bypass grafting
COP	Clinical Outcomes Publication
CVA	Cerebrovascular accident (stroke)
DOSA	Day of surgery admission
DSWI	Deep sternal wound infection
EACTS	European Association for Cardiothoracic Surgery
ERAS	Enhanced recovery after surgery
GIRFT	Getting It Right First Time
GMC	General Medical Council
HDU	High dependency unit
Iso	Isolated
ITU	Intensive therapy (care) unit
LAAO	Left atrial appendage occlusion
MVR	Mitral valve replacement
MVr	Mitral valve repair
NACSA	National Adult Cardiac Surgery Audit
NHSE	NHS England
NICOR	National Institute of Cardiovascular Outcomes Research
NSTEMI	Non ST elevation myocardial infarction (heart attack)
NTN	National Training Number (UK trainee)
PCI	Percutaneous coronary intervention (stenting)
QA	Quality assurance
QI	Quality improvement
SCTS	Society for Cardiothoracic Surgery
STEMI	ST elevation myocardial infarction (heart attack)
TAVI	Transcatheter aortic valve intervention
TIA	Transient ischaemic attack (transient mini-stroke)
TVR	Tricuspid valve replacement or repair

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Please go to www.nicor.org.uk for more information.

Email: nicor.auditenquiries@nhs.net

This report is available online via the NICOR website.

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National Institute of Cardiovascular Outcomes Research (NICOR)

NICOR is a partnership of clinicians, IT experts, statisticians, academics and managers who, together, are responsible for six cardiovascular clinical audits (the National Cardiac Audit Programme – NCAP) and a number of health technology registries, including the UK TAVI registry. Hosted by Arden & GEM CSU, NICOR collects, analyses and interprets vital cardiovascular data into relevant and meaningful information to promote sustainable improvements in patient well-being, safety and outcomes. NICOR is funded by NHS England and the GIG Cymru (NHS Wales).

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Society for Cardiothoracic Surgery in Great Britain & Ireland

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