



Supporting Information

Supplementary results

**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Wall CJ, Vertullo CJ, Gill DRJ, et al. Reduced numbers of elective joint replacement procedures in Australia during the COVID-19 pandemic, 2020–2022: a registry data analysis study. *Med J Aust* 2024; doi: 10.5694/mja2.52318.

1. Estimation of public sector deficits and increased caseload required

The following formulae were used to estimate the deficit the public sector was responsible for:

*Apportioned Public Deficit 2024 = (Total Deficit 2020 to 2022) * ((Public Projected 2023 to 2024) / (Total Projected 2023 to 2024)).*

*Apportioned Public Deficit 2025 = (Total Deficit 2020 to 2022) * ((Public Projected 2023 to 2025) / (Total Projected 2023 to 2025)).*

*Apportioned Public Deficit 2026 = (Total Deficit 2020 to 2022) * ((Public Projected 2023 to 2026) / (Total Projected 2023 to 2026)).*

These figures were then used to calculate the percentage increase in caseload required:

*Percentage Increase Required for 2024 = Apportioned Public Deficit 2024 / (Public Projected 2023 to 2024) * 100*

*Percentage Increase Required for 2025 = Apportioned Public Deficit 2025 / (Public Projected 2023 to 2025) * 100*

*Percentage Increase Required for 2026 = Apportioned Public Deficit 2026 / (Public Projected 2023 to 2026) * 100*

Adjustment for age and sex

Age was adjusted for by utilising the over 65 population projection as an offset. Projected male and female population was included in an initial analysis, but this additional adjustment was not found to improve the model and was therefore not used in the final projection.

Figure 1. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in the Australian Capital Territory, 2012-2026.

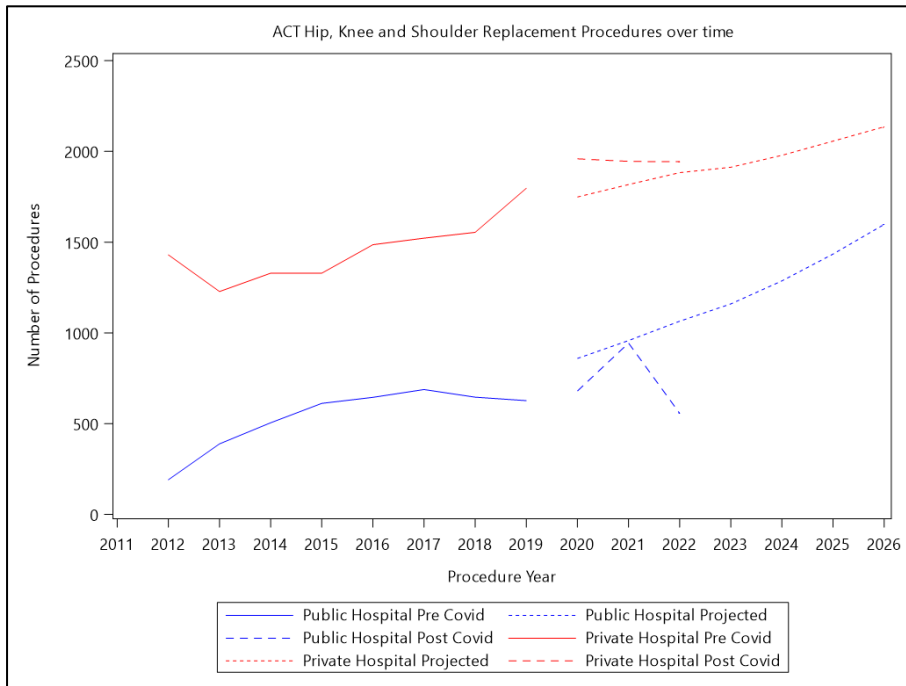


Figure 2. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in New South Wales, 2012-2026.

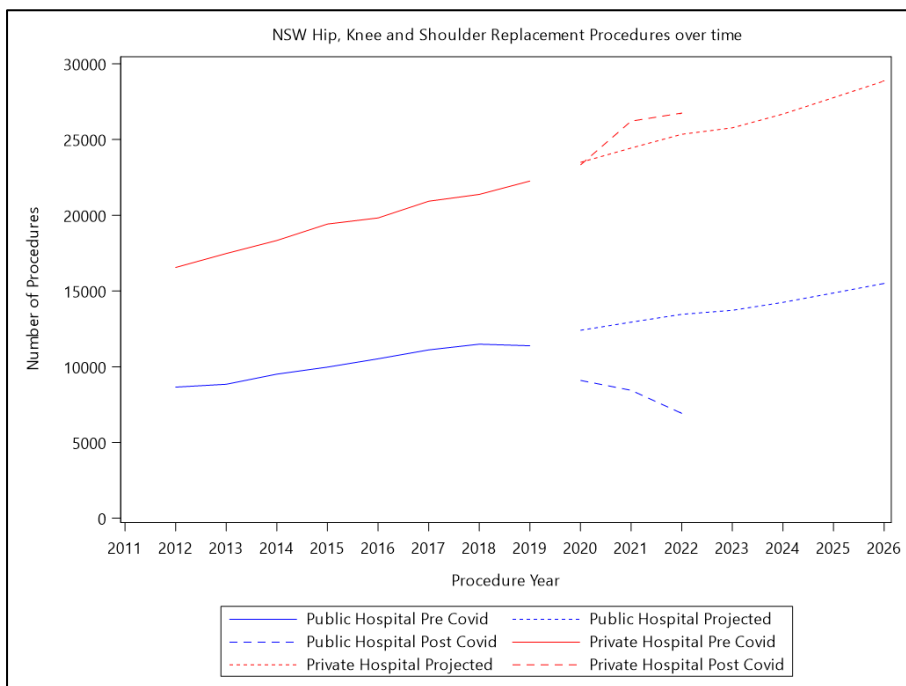


Figure 3. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in the Northern Territory, 2012-2026.

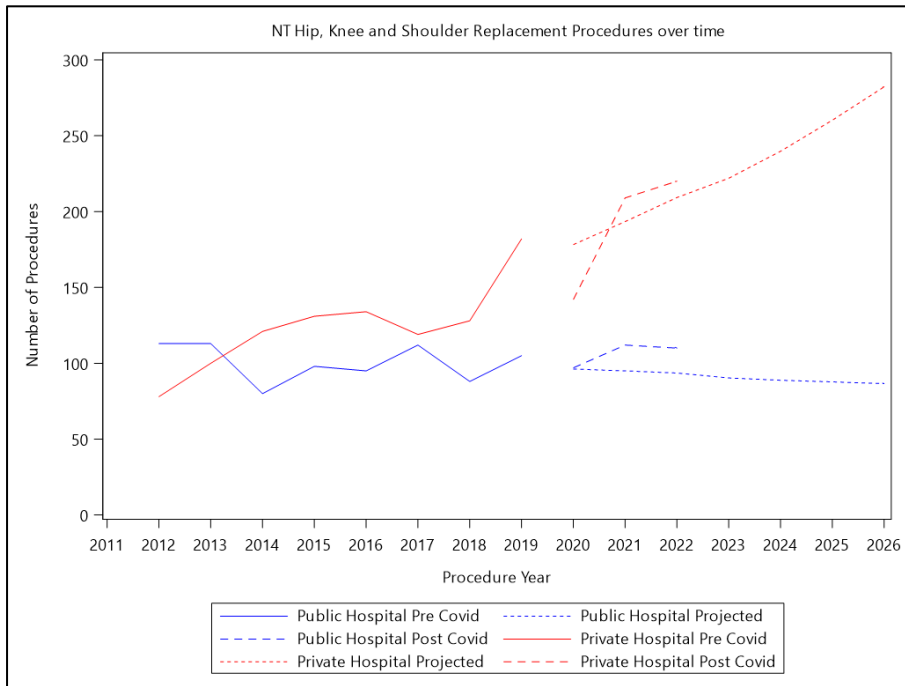


Figure 4. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Queensland, 2012-2026.

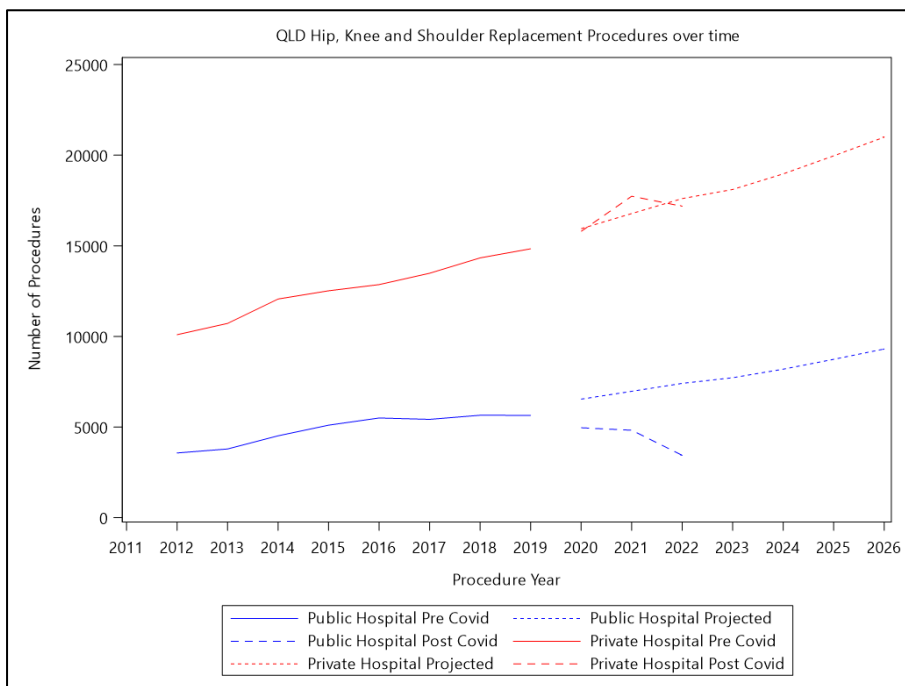


Figure 5. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in South Australia, 2012-2026.

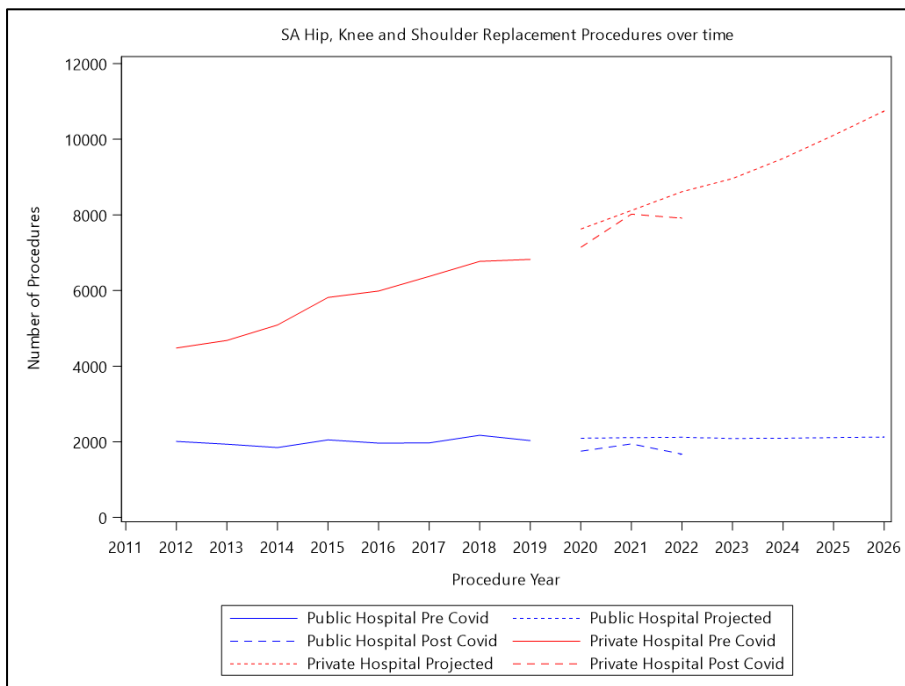


Figure 6. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Tasmania, 2012-2026.

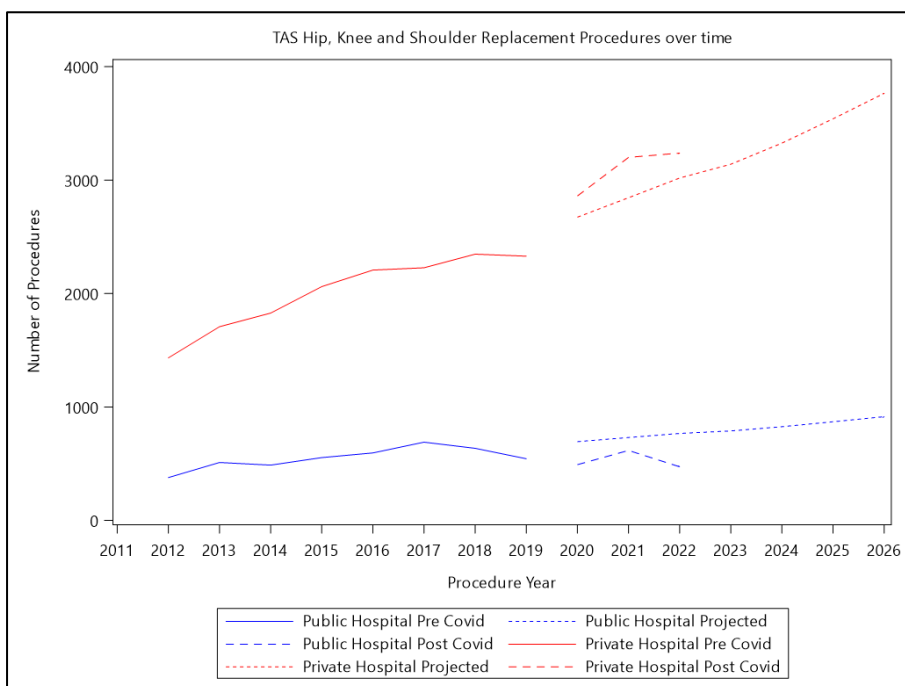


Figure 7. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Victoria, 2012-2026.

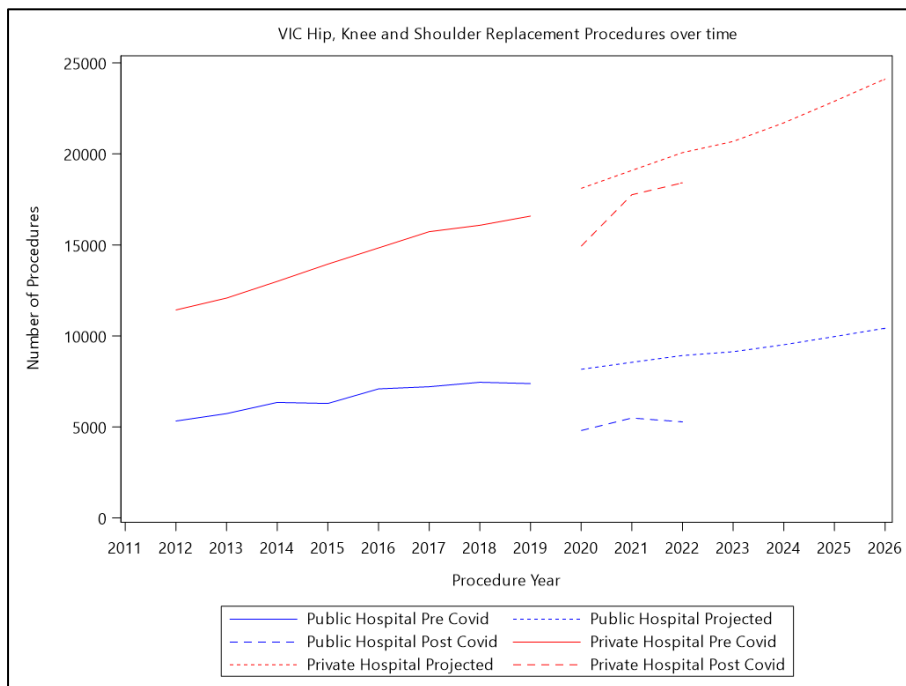


Figure 8. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Western Australia, 2012-2026.

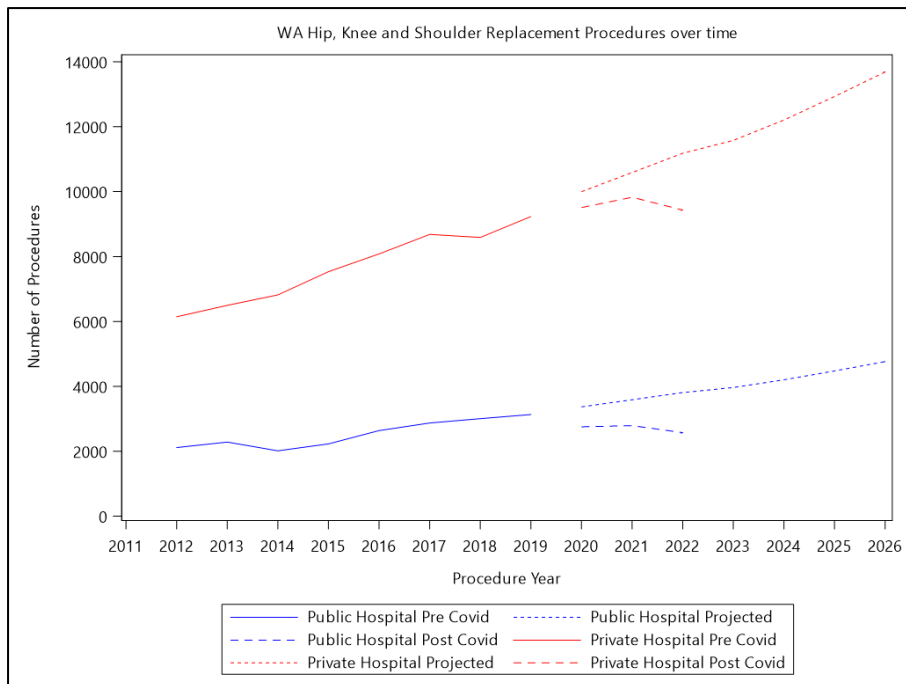


Figure 9. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Australia, 2012-2026.



Table 1. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in the Australian Capital Territory, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	1797	1749	1959	210	1817	1945	128	1883	1943	60
Public	627	859	680	-179	958	944	-14	1064	557	-507
Combined	2424	2590	2639	31	2742	2889	114	2895	2500	-447
Hip replacement										
Private	640	631	691	60	657	737	81	681	750	69
Public	245	326	275	-51	359	348	-11	394	226	-168
Combined	885	953	966	9	1007	1085	70	1062	976	-99
Knee replacement										
Private	1047	1009	1151	142	1043	1090	47	1074	1077	3
Public	353	498	376	-122	560	559	-1	628	306	-322
Combined	1400	1492	1527	20	1575	1649	47	1658	1383	-319
Shoulder replacement										
Private	110	111	117	6	123	118	-5	135	116	-19
Public	29	36	29	-7	40	37	-3	45	25	-20
Combined	139	148	146	-2	163	155	-8	179	141	-38

Table 2. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in New South Wales, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	22260	23493	23323	-170	24439	26214	1775	25347	26748	1401
Public	11385	12408	9099	-3309	12944	8445	-4499	13462	6925	-6537
Combined	33645	35901	32422	-3479	37382	34659	-2723	38807	33673	-5135
Hip replacement										
Private	7542	7899	8004	105	8225	8912	687	8540	9365	825
Public	3969	4273	3281	-992	4470	2988	-1482	4661	2534	-2127
Combined	11511	12172	11285	-887	12694	11900	-795	13200	11899	-1302
Knee replacement										
Private	13323	14039	13806	-233	14518	15653	1135	14969	15660	691
Public	6859	7505	5371	-2134	7786	4974	-2812	8053	4030	-4023
Combined	20182	21544	19177	-2367	22304	20627	-1677	23021	19690	-3332
Shoulder replacement										
Private	1395	1596	1513	-83	1769	1649	-120	1954	1723	-231
Public	557	647	447	-200	718	483	-235	796	361	-435
Combined	1952	2242	1960	-282	2487	2132	-355	2750	2084	-666

Table 3. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in the Northern Territory, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	182	178	142	-36	193	209	16	209	220	11
Public	105	96	97	1	95	112	17	94	110	16
Combined	287	270	239	-35	281	321	33	292	330	27
Hip replacement										
Private	59	51	37	-14	53	60	7	55	76	21
Public	37	33	37	4	32	43	11	31	41	10
Combined	96	83	74	-10	84	103	18	85	117	31
Knee replacement										
Private	117	124	103	-21	138	143	5	153	138	-15
Public	59	56	53	-3	55	67	12	55	66	11
Combined	176	176	156	-24	186	210	17	196	204	-4
Shoulder replacement										
Private	6	5	2	-3	5	6	1	5	6	1
Public	9	7	7	0	8	2	-6	9	3	-6
Combined	15	12	9	-3	13	8	-5	13	9	-5

Table 4. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Queensland, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	14835	15945	15797	-148	16779	17736	957	17605	17182	-423
Public	5648	6541	4962	-1579	6973	4827	-2146	7412	3442	-3970
Combined	20483	22481	20759	-1727	23743	22563	-1190	25001	20624	-4392
Hip replacement										
Private	4538	4875	4954	79	5115	5524	409	5350	5440	90
Public	2060	2357	1790	-567	2522	1743	-779	2692	1324	-1368
Combined	6598	7227	6744	-487	7629	7267	-370	8029	6764	-1278
Knee replacement										
Private	9334	10038	9778	-260	10525	10883	358	11003	10451	-552
Public	3294	3863	2869	-994	4092	2822	-1270	4321	1911	-2410
Combined	12628	13899	12647	-1254	14613	13705	-912	15318	12362	-2962
Shoulder replacement										
Private	963	1059	1065	6	1189	1329	140	1330	1291	-39
Public	294	331	303	-28	376	262	-114	426	207	-219
Combined	1257	1389	1368	-22	1564	1591	26	1755	1498	-258

Table 5. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in South Australia, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	6823	7626	7142	-484	8116	8020	-96	8613	7912	-701
Public	2032	2094	1752	-342	2110	1945	-165	2120	1675	-445
Combined	8855	9682	8894	-826	10160	9965	-262	10629	9587	-1146
Hip replacement										
Private	2489	2811	2542	-269	2997	2890	-107	3187	2842	-345
Public	792	829	690	-139	832	756	-76	832	668	-164
Combined	3281	3621	3232	-408	3796	3646	-183	3968	3510	-509
Knee replacement										
Private	3950	4390	4171	-219	4646	4643	-3	4901	4572	-329
Public	1154	1176	987	-189	1186	1100	-86	1192	948	-244
Combined	5104	5550	5158	-408	5802	5743	-88	6048	5520	-573
Shoulder replacement										
Private	384	436	429	-7	494	487	-7	558	498	-60
Public	86	90	75	-15	94	89	-5	99	59	-40
Combined	470	522	504	-22	582	576	-12	647	557	-100

Table 6. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Tasmania, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	2329	2673	2860	187	2845	3200	355	3018	3238	220
Public	544	695	492	-203	731	617	-114	767	473	-294
Combined	2873	3367	3352	-16	3575	3817	241	3784	3711	-74
Hip replacement										
Private	986	1100	1095	-5	1153	1184	31	1204	1297	93
Public	260	316	249	-67	331	277	-54	345	195	-150
Combined	1246	1417	1344	-73	1484	1461	-23	1549	1492	-57
Knee replacement										
Private	1245	1450	1599	149	1552	1843	291	1656	1768	112
Public	264	349	224	-125	367	308	-59	384	253	-131
Combined	1509	1799	1823	23	1918	2151	232	2038	2021	-19
Shoulder replacement										
Private	98	137	166	29	168	173	5	205	173	-32
Public	20	33	19	-14	40	32	-8	50	25	-25
Combined	118	170	185	15	208	205	-3	255	198	-57

Table 7. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Victoria, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	16584	18108	14932	-3176	19092	17757	-1335	20070	18410	-1660
Public	7382	8168	4803	-3365	8551	5490	-3061	8925	5280	-3645
Combined	23966	26274	19735	-6541	27640	23247	-4396	28989	23690	-5305
Hip replacement										
Private	6801	7343	6353	-990	7674	7555	-119	7996	7871	-125
Public	3230	3500	2227	-1273	3663	2484	-1179	3823	2473	-1350
Combined	10031	10842	8580	-2262	11337	10039	-1298	11819	10344	-1475
Knee replacement										
Private	8870	9698	7739	-1959	10237	9163	-1074	10773	9442	-1331
Public	3807	4239	2361	-1878	4402	2763	-1639	4557	2608	-1949
Combined	12677	13931	10100	-3837	14628	11926	-2712	15313	12050	-3279
Shoulder replacement										
Private	913	1101	840	-261	1243	1039	-204	1399	1097	-302
Public	345	474	215	-259	570	243	-327	685	199	-486
Combined	1258	1566	1055	-519	1797	1282	-531	2055	1296	-788

Table 8. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Western Australia, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	9233	9999	9510	-489	10590	9827	-763	11183	9434	-1749
Public	3134	3370	2756	-614	3588	2792	-796	3810	2576	-1234
Combined	12367	13368	12266	-1103	14178	12619	-1560	14992	12010	-2983
Hip replacement										
Private	3167	3393	3288	-105	3586	3470	-116	3778	3425	-353
Public	1293	1380	1132	-248	1473	1097	-376	1568	1101	-467
Combined	4460	4772	4420	-353	5057	4567	-492	5344	4526	-820
Knee replacement										
Private	5462	5910	5573	-337	6234	5616	-618	6557	5289	-1268
Public	1641	1761	1426	-335	1854	1501	-353	1946	1291	-655
Combined	7103	7670	6999	-671	8088	7117	-971	8502	6580	-1922
Shoulder replacement										
Private	604	711	649	-62	798	741	-57	893	720	-173
Public	200	247	198	-49	294	194	-100	350	184	-166
Combined	804	953	847	-110	1085	935	-157	1230	904	-340

Table 9. Observed and projected incidence of elective hip, knee, and shoulder replacement performed in Australia, 2019-2022. A deficit is indicated as a negative number and a surplus is indicated as a positive number.

	2019 Observed	2020 Projected	2020 Observed	2020 Deficit/Surplus	2021 Projected	2021 Observed	2021 Deficit/Surplus	2022 Projected	2022 Observed	2022 Deficit/Surplus
All procedures										
Private	74043	79733	75665	-4068	83806	84908	1102	87823	85087	-2736
Public	30857	34163	24641	-9522	35829	25172	-10657	37464	21038	-16426
Combined	104900	113895	100306	-13590	119633	110080	-9555	125285	106125	-19162
Hip replacement										
Private	26222	28092	26964	-1128	29440	30332	892	30761	31066	305
Public	11886	12984	9681	-3303	13630	9736	-3894	14265	8562	-5703
Combined	38108	41076	36645	-4431	43070	40068	-3003	45026	39628	-5399
Knee replacement										
Private	43348	46623	43920	-2703	48830	49034	204	50989	48397	-2592
Public	17431	19410	13667	-5743	20234	14094	-6140	21031	11413	-9618
Combined	60779	66031	57587	-8446	69061	63128	-5937	72014	59810	-12210
Shoulder replacement										
Private	4473	5147	4781	-366	5772	5542	-230	6453	5624	-829
Public	1540	1843	1293	-550	2102	1342	-760	2390	1063	-1327
Combined	6013	6988	6074	-916	7869	6884	-990	8834	6687	-2155