

A Survey of the Lower Limb Amputee Population in Scotland 2024 Public Report



SPARG
Scottish Physiotherapy Amputee
Research Group

April 2026

Authors

Miss R Carr, SPARG Data Officer
Mrs J Hebenton, SPARG Chairman
Dr F Davie-Smith, SPARG Research Officer



National Centre for Prosthetics
and Orthotics
University of Strathclyde
Curran Building
131 St. James' Road
Glasgow G4 0LS



WestMARC
Queen Elizabeth University
Hospital
1345 Govan Road
Glasgow G51 4TF

Contents

1	Acknowledgements.....	6
2	SPARG 2024 Annual Report: Executive Summary	7
3	Introduction	8
4	Results: Demographic Profiles	9
4.1	Introduction	9
4.2	Amputee Details	9
4.2.1	Age and Sex Distribution.....	9
4.2.2	Immediate cause of amputation	10
4.2.3	PAD and Diabetes.....	11
4.2.4	Aetiology of Amputation	12
4.2.5	Initial Level of Amputation	13
4.2.6	Patients Fitted with a Prosthesis	13
4.2.7	Prosthetic Rehabilitation Abandoned	15
4.2.8	Mortality	16
4.2.9	Final Outcome Summary.....	16
4.2.10	Patients with Unilateral and Bilateral Amputations	18
4.2.11	Bilateral Amputations	19
4.2.12	Bilateral Amputations in Same Episode of Care	19
4.2.13	Falls	20
4.2.14	Revisions and Re-amputations	21
4.2.15	Functional Co-morbidities Index.....	22
5	Physiotherapy and Rehabilitation.....	23
5.1	Compression Therapy.....	23
5.2	Early Walking Aids	23
5.3	Mobility Outcomes: Locomotor Capabilities Index-5 (LCI-5).....	24
6	Milestone Data	25
6.1	Statistics Presented	25
6.2	Days to Casting	26
6.3	Casting to Delivery	27
6.4	Days to Inpatient Discharge: Fitted with a Prosthesis.....	27
6.5	Days to Inpatient Discharge: Not Fitted with a Prosthesis.....	28
6.6	Days from in-patient to out-patient discharge: Limb-fitted	28
7	Trends in Compression Therapy and Early Walking Aids (EWAs)	30
7.1	Statistics Presented	30
7.2	Trends in Compression Therapy.....	30
7.3	Trends in Early Walking Aids	31
8	Limb -fitting Centres	32
8.1	Hospital to Limb fitting centre	32
8.2	Milestones by Limb-fitting centre.....	33
9	Models of Care	34
9.1	Individual Hospital data	35
9.1.1	Vascular Centralisation in Scotland	35

9.1.2	Patient Journey – Centralised Services	39
9.1.3	Aberdeen Royal Infirmary (ARI), NHS Grampian	41
9.1.4	University Hospital Ayr and University Hospital Crosshouse, NHS Ayrshire & Arran.....	43
9.1.5	Glasgow Royal Infirmary (GRI), NHS Greater Glasgow & Clyde.....	45
9.1.6	Royal Infirmary Edinburgh (RIE) / Astley Ainslie Hospital, NHS Lothian	47
9.1.7	Raigmore Hospital, NHS Highland.....	49
9.1.8	Ninewells Hospital, NHS Tayside.....	51
9.1.9	Queen Elizabeth University Hospital (QEUH), NHS Greater Glasgow & Clyde	53
9.1.10	University Hospital Hairmyers, NHS Lanarkshire.....	56
10	Individual Hospital Summaries for 2024.....	59
10.1	Data Checking Summary.....	59
10.2	Key Performance Indicators by Hospital	60
10.2.1	Age and FCI	60
10.2.2	Final Level of Amputation.....	61
10.2.3	Final Outcome	62
10.3	Milestones by hospital (limb-fitted unilateral transtibial amputees).....	63
11	References.....	64
12	Appendices.....	65
12.1	Appendix A Bibliography & Research.....	65
12.2	Appendix B Aetiology Mapping	66
12.3	Appendix C Locomotor Capabilities Index 5	67
12.4	Appendix D Functional Co-morbidities Index.....	68
12.5	Appendix E Timed Up and Go Test (TUG)	69

Tables and Figures

Table 1	Age and sex of amputee population, 2020- 2024.....	9
Table 2	Cause of amputation recorded by level and by aetiology: 2024	10
Table 3	Cause of amputation 2020 - 2024 for all levels.....	10
Table 4	PAD and Diabetes, age and sex, 2020 – 2024	11
Table 5	Aetiology of amputation, 2020 - 2024	12
Table 6	Amputation Level, 2020 - 2024	13
Table 7	Patients fitted with a prosthesis 2020 - 2024	13
Table 8	Proportion of patients with unilateral amputation successfully fitted with a prosthesis by level 2020 – 2024.	13
Table 9	Proportion of patients with bilateral amputations successfully limb-fitted, bilateral 2020 - 2024	14
Table 10	Bilateral patients limb-fitted by level 2024.....	14
Table 11	Sex and limb-fitting outcome, by level, 2020 - 2024.....	14
Table 12	Prosthetic rehabilitation abandoned as a proportion of those limb-fitted, 2020 – 2024	15
Table 13	Mortality 2020 - 2024	16
Table 14	Final outcome summary, 2020 - 2024.....	16
Table 15	Final outcome by aetiology for 2024	17

Table 16	Unilateral and bilateral amputees, 2020-2024	18
Table 17	Bilateral amputees, 2020 - 2024	18
Table 18	Demographic profile and final outcome summary of those with bilateral amputations at end of rehabilitation period, 2024	19
Table 19	Bilateral amputations, 2020-2024	19
Table 20	Reported falls in hospital for all amputees and also for unilateral and bilateral amputees (all levels) 2024.....	20
Table 21	Recorded falls at home for all amputees who had outpatient physiotherapy 2024.....	20
Table 22	Recorded falls for all amputees 2020-2024.	20
Table 23	Recorded Falls based on Limb Fitting Outcome 2024.	20
Table 24	Revisions and re-amputations, 2020-2024	21
Table 25	Transtibial to transfemoral re-amputations, 2020-2024.....	21
Table 26	Functional Co-Morbidities by Level and Aetiology, 2024	22
Table 27	Functional Co-morbidities Mean Score, 2020 - 2024	22
Table 28	Type of compression therapy used, 2020-2024	23
Table 29	Type of compression therapy used by amputation level (limb fitted), 2024	23
Table 30	Type of EWA used, 2020-2024	23
Table 31	Type of EWA used by amputation level (Limb-fitted), 2024	23
Table 32	Locomotor Capabilities Index by level, 2020 - 2024.....	24
Table 33	Days to casting milestone, descriptive statistics, 2024.	26
Table 34	Casting to delivery milestone, descriptive statistics, 2024	27
Table 35	Median casting to delivery milestone, 2020-2024	27
Table 36	Days to in-patient discharge, limb-fitted, descriptive statistics, 2024	27
Table 37	Median days to in-patient discharge, limb-fitted, 2020-2024 (Unilateral Only)	27
Table 38	Days to in-patient discharge, patients' not limb-fitted, descriptive statistics, 2024.	28
Table 39	Median days to in-patient discharge, patients not limb-fitted, 2020-2024 (Unilateral Only)	28
Table 40	Days from in-patient discharge to out-patient discharge, limb-fitted, 2024.....	28
Table 41	Median Days from in-patient discharge to outpatient discharge, limb-fitted 2020 - 2024	29
Table 42	Patients receiving compression therapy within 10 days of amputation (%), 2020 - 2024.	30
Table 43	Patients using EWAs within 10 days of amputation (%), 2020 - 2024.	31
Table 44	Limb-fitting centres, referring hospitals and % limb-fitted, 2024.....	32

Table 45	Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre, 2024	33
Table 47	MOC Scoring system	34
Table 48	Data Checking Summary by Hospital, 2024	59
Table 49	Median Age, and FCI, 2024	60
Table 50	Final level of Amputation at end of Rehabilitation by Hospital, 2024	61
Table 51	Key Performance Indicators by Hospital, 2024	62
Table 52	Key Performance Indicators (milestones) by hospital, 2024	63
Figure 1	Rehabilitation Milestones	25
Figure 2	Groups in milestones	25
Figure 3	Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2020-2024	26
Figure 4	Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2020 - 2024.....	30
Figure 5	Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2020 - 2024.....	31

1 Acknowledgements

We wish to thank all physiotherapy teams who are involved in the work of SPARG and without whose loyal, tireless, and determined support this work would not have been accomplished.

The full report can be accessed from the BACPAR website (BACPAR website: <https://www.bacpar.org/resources/sparg-resources/sparg-public-reports/>)

2 SPARG 2024 Annual Report: Executive Summary

- 2024 includes Aberdeen's data for the first time 2014
- The number of amputations in Scotland remained high in 2024 (n=886). The number of hip disarticulations was also notably high for a second year in a row (n=11).
- The population of those with a major lower limb amputation (MLLA) in Scotland continue to have a median age of around 68 years and 70% are male. The ratio of transtibial (TTA) to transfemoral (TFA) amputations is 1.5:1, this is largely unchanged.
- Dysvascular aetiology remains the leading cause of MLLA in Scotland.
- The number of patients limb-fitted overall remains constant at 40%–45%. Over the last few years the TTA limb-fitting is sustained around 65%, whilst TFA limb fitting rate is nearer 20%.
- When reporting on limb-fitting percentages we typically consider the combined percentage of males and females. However, in 2024 there were less female unilateral TTAs limb-fitted (51.2%), compared with the males (70.5%). For unilateral TFA, females who were limb-fitted were often considerably reduced compared to their male counterparts (10.2% vs 20.9% in 2020, 13% vs 22.7% in 2023, and 12.9% vs 26.3% in 2024).
- Transfemoral limb fitting numbers continue to be low, and highly variable across Scotland. In 2023, TORT limb-fitted 7% in 2023 this increased to 13% in 2024, but Hairmyres was reduced at 8% in 2024. Conversely, Raigmore fitted 57% in 2024, with WestMARC, SMART and MARS sitting around 25%.
- The median days from casting to delivery for TFA and TTA patients stayed at 14 days in 2024. This appears to be a new norm since 2022 for TFA, and 2023 for TTA.
- Receiving compression within 10 days of MLLA is on the decline again from a peak in 2022. 64% of TTA and 41% of TFA were fitted within this timeframe.
- Starting EWA within 10 days remains low in both TTA (35%) and TFA (20%) groups.
- Falls rates across all patients is relatively stable at around 20% in hospital, but falls at home have been slowly increasing. The hospital falls rate in patients who went on to limb-fit and patients who abandoned limb-fitting was significantly higher in 2024 at 30% and 41%.
- The functional co-morbidities index (FCI) mean score remains highest for patients with diabetes, this has increased slightly in 2023 (3.1) and 2024 (3.2). Diabetes account for the largest aetiology in MLLAs, this combined with increasing co-morbidity scores might explain why the complexity of our patient group seems to be increasing.

3 Introduction

This is the 31st Annual Report on data collated from all major lower limb amputations (MLLA) in Scotland by the Scottish Physiotherapy Amputee Research Group (SPARG). All MLLAs carried out in 2024 are included: ankle disarticulation (AD); transtibial (TTA); knee disarticulation (KDA); transfemoral (TFA); hip disarticulation (HD) and transpelvic (TP). Patients having partial amputations of the feet and amputation of the toes are excluded. In 2024, data continued to be inputted on an excel spreadsheet. There are seven spreadsheets, with access limited to the relevant Physiotherapists, available to enable local inputting (Aberdeen, Ayrshire, Dundee, Edinburgh, Glasgow, Hairmyres & Inverness). At the end of the data collection period a master spreadsheet was created, accumulating all seven spreadsheets allowing for data checking and analysis.

National and individual hospital data are presented in this report. All outcomes are reported according to final level of MLLA. Individual hospital data are summarised to facilitate comparison of outcomes and the benchmarking of services. The comparative data items or key performance indicators (KPIs) for each hospital were identified by a previous, multidisciplinary benchmarking exercise³. Each of the larger centres' (n≥10) model of care (MOC) has been described according to criteria identified in the benchmarking report and agreed following consultation with SPARG members. Each MOC has been scored according to a system described in a study into the impact pathways have on rehabilitation milestones and outcomes after amputation ¹.

There were 7 forms missing in 2024 and a further 2 had a significant amount of information missing but were included as the basic demographic and amputation details were available.

This is the first time in nine years that the data for those patients who underwent an amputation in the Grampian region are included in the data analysis – welcome back!

.

4 Results: Demographic Profiles

4.1 Introduction

National survey data are presented in this section. Where possible, comparisons are shown for 2020-2024. The total number of amputees for 2024 were 864; included in the analysis are 857 data sets. Missing data includes all data sets from the forms not returned for data input (n=7). In 2024, 857 patients underwent 886 amputation procedures; some patients having had bilateral amputations during the same episode of care.

4.2 Amputee Details

4.2.1 Age and Sex Distribution

The report contains data from 857 amputees. The data for numbers of amputees from 2020-2024 by age and sex is shown in Table 1.

Table 1 Age and sex of amputee population, 2020- 2024

	2020	2021	2022	2023	2024
No. of Amputees	752	776	798	914	858
No. of Amputee with Data	677	673	704	802	857
Males %	70.8%	69.8%	73.6%	70.8%	70.4%
Females %	29.2%	30.2%	26.4%	29.2%	29.6%
Age Median (years)	67	66	67	66	68
Age Upper Quartile (years)	76	74	74	75	75.5
Age Lower Quartile (years)	59	58	58	57	60

4.2.2 Immediate cause of amputation

Ischaemia was the main cause of amputation (Table 2) in those with PAD and those with Diabetes. This is consistent with the past five years of data (Table 3).

Table 2 Cause of amputation recorded by level and by aetiology: 2024

Cause of amputation 2024	Ischaemia		Infection	Combination *	N/A**
	n=431 (50%)		n=220 (26%)	n=134 (16%)	n=51 (6%)
Level n= 857 (0 missing)	TT	227	146	87	18
	TF	203	69	46	23
	TP	0	0	0	1
	HD	0	5	0	6
	KD	1	0	1	2
	AD	0	0	0	1
Aetiology n= 857 (0 missing)	PAD without diabetes	222 (46.2%)	11 (5%)	33 (24.6%)	0 (0%)
	Diabetes	229 (47.6%)	161 (73.2%)	93 (69.4%)	0 (0%)

*Combination is when both ischaemia and infection were present, ** N/A is not caused by either ischaemia or infection

Table 3 Cause of amputation 2020 - 2024 for all levels

Cause of amputation	Ischaemia	Infection	Combination*	N/A**
2020	58%	23%	14%	5%
2021	54%	28%	13.5%	4.5%
2022	54%	24%	16%	6%
2023	52%	28%	14%	6%
2024	54%	25%	15.5%	5.5%

*Combination is when both ischaemia and infection were present, ** N/A is not caused by either ischaemia or infection

4.2.3 PAD and Diabetes

The following table summarises the age and sex of persons with MLLA with aetiology of diabetes, and PAD without diabetes, 2020 - 2024.

Table 4 PAD and Diabetes, age and sex, 2020 – 2024

	2020		2021		2022		2023		2024	
	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes
Number of Amputees	389	237	386	210	388	219	448	232	476	255
Number with age available	373	227	376	209	388	219	448	232	476	255
Age Median	68	71	66	70	66	70	70	70	67	71
Age Upper Quartile	75	78	74	77	73	78	74	78	74	80
Age Lower Quartile	60	63	58	62	59	63	59	62	61	64
N Male	287	150	269	140	307	150	338	158	364	166
N Female	86	77	107	61	81	69	110	74	112	89
Males %	76.9%	66.1%	71.5%	69.7%	79%	68.5%	75.4%	68.1%	76.5%	65%
Females %	23.1%	33.9%	28.5%	30.3%	21%	31.5%	24.6%	31.9%	23.5%	35%

4.2.4 Aetiology of Amputation

The incidence of each aetiology recorded is shown in Table 5. Peripheral arterial disease (with and without diabetes) accounted for 84.6% of all amputations in 2024. Orthopaedic aetiology was not sub-categorised in 2023, but this has been rectified in 2024.

Table 5 Aetiology of amputation, 2020 - 2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
PAD without diabetes	237	33.4%	210	30.1%	232	31.9%	243	29.1%	266	30%
Diabetes	389	54.9%	386	55.3%	395	54.3%	463	55.4%	484	54.6%
Trauma or Burns	13	1.8%	18	2.6%	21	2.9%	24	2.9%	22	2.5%
Tumour	11	1.6%	12	1.7%	14	1.9%	14	1.7%	21	2.4%
Congenital deformity	0	0%	0	0%	3	0.4%	1	0.1%	3	0.3%
Drug abuse	7	1%	13	1.9%	24	3.3%	18	2.2%	14	1.6%
Venous disease	10	1.4%	17	2.4%	9	1.2%	2	0.2%	0	0%
Orthopaedic (total)***	14	2%	13	1.8%	10	1.4%	36	4.3%	45	5.2%
Orthopaedic – non union	9	1.3%	10	1.4%	3	0.4%	**	**	20	2.3%
Orthopaedic failed joint	0	0%	2	0.3%	5	0.7%	**	**	12	1.4%
Orthopaedic acquired deformity	1	0.1%	1	0.1%	2	0.3%	**	**	13	1.5%
Blood-borne infection	16	2.3%	9	1.3%	7	1%	15	1.8%	7	0.8%
Renal Failure	2	0.3%	1	0.1%	1	0.1%	2	0.2%	1	0.1%
CRPS *	5	0.7%	10	1.4%	5	0.7%	2	0.2%	1	0.1%
Acute Vascular Injury	5	0.7%	9	1.3%	7	1%	16	1.9%	22	2.5%
Not recorded	0	0%	0	0%	0	0%	0	0%	0	0%
Total	709	100%	698	100%	728	100%	836	100%	886	100%

* Chronic Regional Pain Syndrome (CRPS)

** Changes to the data collection process meant that orthopaedic aetiologies were not split into subcategories; this issue has been addressed in 2024.

4.2.5 Initial Level of Amputation

Table 6 shows the incidence of six levels of MLLA for the years 2020 - 2024. For those who had bilateral MLLA in the reported period, both MLLAs are included in the data. The number of levels recorded will therefore be greater than the number of patients for any given year. The level indicates the initial level of MLLA.

Table 6 Amputation Level, 2020 - 2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Transtibial	403	56.8%	407	58.3%	459	63%	496	59.3%	528	59.6%
Transfemoral	293	41.3%	286	41%	262	36%	319	38.2%	341	38.5%
Trans pelvic	3	0.4%	0	0%	2	0.3%	3	0.4%	1	0.1%
Hip Disarticulation	2	0.3%	3	0.4%	2	0.3%	14	1.7%	11	1.2%
Knee Disarticulation	8	1.1%	2	0.3%	3	0.4%	4	0.5%	4	0.5%
Ankle Disarticulation	0	0%	0	0%	0	0%	0	0%	1	0.1%
Other	0	0%	0	0%	0	0%	0	0%	0	0%
Not recorded	0	0%	0	0%	0	0%	0	0%	0	0%
Total	709	100%	698	100%	728	100%	836	100%	886	100%

4.2.6 Patients Fitted with a Prosthesis

The number of patients limb-fitted at final discharge is shown in Table 7. Unilateral patients' limb-fitted are shown in Table 8, and bilateral patients are shown in Table 9. Table 10 gives more detail on bilateral patients fitted by their exact level of amputation. Table 11 shows the proportion of males and females who were fitted with a prosthesis, by level. Those patients who have abandoned limb-fitting are not included in this "limb-fitted" patient group.

Table 7 Patients fitted with a prosthesis 2020 - 2024

	2020	2021	2022	2023	2024
Total Number (n=)	677	673	703	800	856
Number fitted (n=)	264	304	297	339	362
Percentage fitted (%)	39%	45.2%	42.2%	42.4%	42.3%

Table 8 Proportion of patients with unilateral amputation successfully fitted with a prosthesis by level 2020 – 2024.

	2020	2021	2022	2023	2024
TTA (%)	63.1%	69.2%	65.1%	66.2%	66.1%
TFA (%)	16.9%	27.3%	15.4%	19.1%	21.3%
Other (%)	18.1%	33.3%	44.4%	14.3%	33.3%

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 9 Proportion of patients with bilateral amputations successfully limb-fitted, bilateral 2020 - 2024

	2019	2020	2021	2022	2023	2024
Bilateral – all levels %	21.9%	29.2%	22.7%	30.9%	34.4%	25%

Table 10 Bilateral patients limb-fitted by level 2024

	Bilateral TTA n=68	Bilateral TFA n=50	TTA & TFA n=25
Limb-fitted n (%)	32 (47%)	0 (0%)	4 (16%)

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 11 Sex and limb-fitting outcome, by level, 2020 - 2024

Unilateral TTA	2020	2021	2022	2023	2024
Total Males (n)	226	227	261	267	298
Total Females (n)	67	72	74	90	86
Males Limb-fitted (n)	152	161	167	177	210
Females Limb-fitted (n)	33	46	51	58	44
% Limb-fitted - Male	67.3%	70.9%	64%	66.3%	70.5%
% Limb-fitted - Female	49.3%	63.9%	68.9%	64.4%	51.2%
Unilateral TFA	2020	2021	2022	2023	2024
Total Males (n)	162	155	154	185	194
Total Females (n)	98	94	80	108	116
Males Limb-fitted (n)	34	45	26	42	51
Females Limb-fitted (n)	10	23	10	14	15
% Limb-fitted - Male	20.9%	29%	16.9%	22.7%	26.3%
% Limb-fitted - Female	10.2%	24.5%	12.5%	13%	12.9%
Bilateral	2020	2021	2022	2023	2024
Total Males (n)	87	85	96	101	102
Total Females (n)	26	34	30	30	42
Males Limb-fitted (n)	30	21	35	37	25
Females Limb-fitted (n)	3	6	4	8	11
% Limb-fitted - Male	34.5%	24.7%	36.5%	36.6%	24.5%
% Limb-fitted - Female	11.5%	17.6%	13.3%	26.7%	26.2%

Abbreviations: TTA=transtibial, TFA=transfemoral

4.2.7 Prosthetic Rehabilitation Abandoned

There are a number of patients each year who are limb-fitted and start prosthetic rehabilitation but for whom prosthetic treatment is abandoned prior to their final discharge from physiotherapy. The amputation level referred to in this section is the final level if re-amputation surgery has been carried out. Table 12 shows those patients who have abandoned use of their prosthesis as a proportion of those initially limb-fitted.

Table 12 Prosthetic rehabilitation abandoned as a proportion of those limb-fitted, 2020 – 2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
All amputees	17	2.5%	15	2.2%	41	6%	29	3.6%	22	2.6
Unilateral TTA	9	3.1%	9	3%	21	6%	7	2%	10	2.6
Unilateral TFA	7	2.7%	3	1.2%	17	7%	11	3.8%	8	2.6
Other	0	0%	0	0%	0	0%	1	4.8%	0	0%
Bilateral	1	0.9%	3	2.5%	3	2%	0	0%	4	2.8%

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.8 Mortality

Table 13 shows the proportion of patients who died within 30 days of their initial amputation, 2020 - 2024

Table 13 Mortality 2020 - 2024

	2020	2021	2022	2023	2024
Number of amputees	677	673	704	802	857
30-day Mortality (n)	37	41	42	43	51
30-day Mortality (%)	5.5%	6.1%	6%	5.4%	6%

4.2.9 Final Outcome Summary

Table 14 gives a summary of gross outcomes for all amputees at the time of final discharge from physiotherapy whether at in-patient discharge or after a period of out-patient treatment from 2020-2024. Non limb-fitted now includes those who abandoned prosthetic use as that was their final outcome. Table 15 shows final outcome by aetiology and including those abandoned prosthetic rehabilitation, for 2024.

Table 14 Final outcome summary, 2020 - 2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Limb-fitted	264	39%	304	45.2%	297	42.2%	339	42.3%	362	42.2%
Not Limb-fitted	329	48.6%	286	42.5%	301	42.8%	332	41.4%	389	45.4%
Deceased	84	12.4%	83	12.3%	105	14.9%	110	13.7%	105	12.3%
Unknown	0	0%	0	0%	1	0.1%	2	0.2%	1	0.1%

Table 15 **Final outcome by aetiology for 2024**

Aetiology	Limb-fitted n (%)	Non-limb-fitted n (%)	Abandoned n (%)	Deceased n (%)
PAD	83 (32.5%)	126 (49.4%)	13 (5.1%)	33 (12.9%)
Diabetes	213 (44.8%)	197 (41.5%)	9 (1.9%)	56 (11.8%)
Trauma or burns	14 (73.7%)	3 (15.8%)	0 (0%)	2 (10.5%)
Tumour	10 (47.6%)	8 (38.1%)	0 (0%)	3 (14.3%)
Congenital deformity	1 (33.3%)	2 (66.7%)	0 (0%)	0 (0%)
Drug abuse	3 (21.4%)	8 (57.1%)	0 (0%)	3 (21.4%)
Venous disease	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Ortho - all	-	-	-	-
Ortho non-union	14 (70%)	4 (20%)	0 (0%)	2 (10%)
Ortho joint replacement	5 (41.7%)	5 (41.7%)	0 (0%)	2 (16.7%)
Ortho acquired deformity	5 (38.5%)	8 (61.5%)	0 (0%)	0 (0%)
Blood borne infection	3 (75%)	1 (25%)	0 (0%)	0 (0%)
Renal Failure	0 (0%)	1 (100%)	0 (0%)	0 (0%)
CRPS	1 (100%)	0 (0%)	0 (0%)	0 (0%)
Acute vascular incident	10 (55.6%)	3 (22.2%)	0 (0%)	4 (22.2%)

4.2.10 Patients with Unilateral and Bilateral Amputations

Table 16 shows the number of unilateral and bilateral amputees for the years 2020-2024. In this table patients with bilateral MLLA includes all patients who were bilateral in the reported year. Bilateral MLLAs are defined in more detail in Table 17 where there are two groups shown: those amputees who had a prior amputation; and those who were not previously amputees, that is, underwent bilateral amputations in the same episode of care.

Table 16 Unilateral and bilateral amputees, 2020-2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Number of amputees	677	100%	673	100%	704	100%	802	100%	857	100%
Unilateral amputees	564	83.3%	554	82.3%	578	82.1%	671	80.3%	713	83.2%
Bilateral amputees	113	16.7%	119	17.6%	126	17.9%	131	15.7%	144	16.8%

Table 17 Bilateral amputees, 2020 - 2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Bilateral Total	113	100%	119	100%	126	100%	131	100%	144	100%
Bilateral – prior amputation(s)	81	71.7%	94	79%	102	81%	97	74%	115	79.9%
Bilateral – both in same episode	32	28.3%	25	21%	24	19%	34	26%	29	20.1%

4.2.11 Bilateral Amputations

Demographic and final outcome data for all with bilateral amputations are shown below in Table 18, 2024

Table 18 Demographic profile and final outcome summary of those with bilateral amputations at end of rehabilitation period, 2024

	Bilateral TTA	Bilateral TFA	TTA & TFA
Number	68	50	25
Age (median, years)	64	68	64
Sex (Male)-n (%)	52 (76.5%)	31 (62%)	19 (76%)
Aetiology			
PAD without diabetes-n (%)	6 (8.8%)	25 (50%)	5 (20%)
Diabetes-n (%)	53 (77.9%)	23 (46%)	19 (76%)
Other-n (%)	9 (13.3%)	2 (4%)	1 (4%)
Final Outcome			
Limb-fitted-n (%)	32 (47.1%)	0 (0%)	4 (16%)
Non-Limb-fitted-n (%)	27 (39.7%)	44 (88%)	16 (64%)
Died-n (%)	7 (10.3%)	5 (10%)	4 (16%)
Abandoned-n (%)	2 (2.9%)	1 (2%)	1 (4%)
Missing-n (%)	0 (0%)	0 (0%)	0 (0%)

Abbreviations: TFA=transfemoral, TTA=transtibial, PAD=Peripheral Arterial Disease.

4.2.12 Bilateral Amputations in Same Episode of Care

The number and levels of bilateral amputations carried out in the same episode of care are shown in Table 19 below for 2020-2024.

Table 19 Bilateral amputations, 2020-2024

	2020	2021	2022	2023	2024
Bilateral TTA	16	13	10	14	17
Bilateral TFA	10	9	10	15	8
TTA & TFA	4	3	4	5	4
Other	2	0	0	0	0
Total	32	25	24	34	29

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.13 Falls

Table 20 shows falls recorded for all amputees and also for unilateral and bilateral amputees (all levels) 2024. Table 21 shows falls at home, for all amputees who had outpatient physiotherapy. Falls at home are not recorded for those who do not receive any physiotherapy following in patient discharge. Note this is not the number of falls but is the number of amputees who reported a fall during their rehabilitation period. Table 22 shows recorded falls in hospital for 2020-2024. Table 23 shows falls recorded both in hospital and at home by limb fitting outcome for 2024.

Table 20 Reported falls in hospital for all amputees and also for unilateral and bilateral amputees (all levels) 2024.

Amputee Inpatient rehab	All Amputees n=857	Unilateral n=713	Bilateral - previously unilateral n=115	Bilateral – same episode n=29
In hospital n (%)	185 (22%)	169 (24%)	8 (7%)	8 (28%)

Table 21 Recorded falls at home for all amputees who had outpatient physiotherapy 2024.

Amputees Outpatient rehab	All Amputees n=362	Unilateral n=326	Bilateral - previously unilateral n=25	Bilateral - same episode n=11
At home n (%)	94 (26%)	85 (26%)	3 (12%)	6 (55%)

Table 22 Recorded falls for all amputees 2020-2024.

Recorded falls	2020	2021	2022	2023	2024
In hospital %	19%	19%	20%	17%	22%
At home %	17%	15%	18%	22%	26%

Table 23 Recorded Falls based on Limb Fitting Outcome 2024.

	Limb-Fitted	Non-Limb-fitted	Abandoned
Falls in hospital %	30%	16%	41%
Falls at home %	26%	n/a	27%

4.2.14 Revisions and Re-amputations

The number of amputees having revision or re-amputation surgery is shown in Table 24. A revision is defined as further primary residual limb surgery which may involve bone but does not change the level of amputation. A re-amputation is defined as further surgery of the primary residual limb, which changes the level of amputation. Each revision and re-amputation are counted, therefore amputees who had a revision then a re-amputation would be included in both counts.

Re-amputations from the transtibial to the transfemoral level for 2020-2024 are shown in Table 25.

Table 24 Revisions and re-amputations, 2020-2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Amputations	709	100%	698	100%	728	100%	836	100%	886	100
Revisions	20	2.8%	11	1.6%	12	1.6%	21	2.5%	15	1.7%
Re-amputations	33	4.7%	39	5.6%	47	6.5%	47	5.6%	52	5.9%
Total revisions + re-amputations	53	7.5%	50	7.1%	60	8.2%	68	8.1%	67	7.6%

Table 25 Transtibial to transfemoral re-amputations, 2020-2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Initial TTA	403	100%	407	100%	459	100%	496	100%	528	100%
Re-amputated to TFA	31	7.7%	38	9.3%	45	9.8%	43	8.7%	53	10%

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.15 Functional Co-morbidities Index

The Functional Co-morbidities Index (FCI) was incorporated into the data set from 2008 in an effort to account for the relatively high incidence of co-morbid disease in the lower limb amputee population (see Appendix F).

The FCI is completed by scoring 1 if a disease is present, that is, diagnosed and recorded in the medical notes of a patient, and 0 if not. A score of 0 indicates no co-morbid disease and a score of 18 the highest number of co-morbid illnesses.

Table 26 shows FCI by level and aetiology 2024. The mean scores for 2020 – 2024 are shown in table 27.

Table 26 Functional Co-Morbidities by Level and Aetiology, 2024

	Number	Min	Max	Mean
All	857	0	9	2.8
Level of Amputation				
Unilateral TTA	384	0	9	2.9
Unilateral TFA	310	0	8	2.7
Other	18	0	5	1.7
All Bilateral	144	0	6	2.8
Bilateral TTA	68	0	6	2.9
Bilateral TFA	50	0	6	2.6
TTA & TFA	25	1	5	2.9
Aetiology				
PAD without diabetes	255	0	8	2.6
Diabetes	476	0	9	3.2
Other	126	0	5	1.6

Abbreviations: TFA=transfemoral, TTA=transtibial, PAD=Peripheral Arterial Disease

Table 27 Functional Co-morbidities Mean Score, 2020 - 2024

	2020	2021	2022	2023	2024
All	2.8	2.8	2.8	2.7	2.8
Unilateral TTA	2.7	2.8	2.8	2.8	2.9
Unilateral TFA	2.8	2.8	2.7	2.5	2.7
Other	1.7	1.0	1.5	1.1	1.7
All Bilateral	3.0	3.0	3.0	3	2.8
PAD without diabetes	2.0	2.0	2.6	2.4	2.6
Diabetes	3.0	3.0	3.0	3.1	3.2

Abbreviations: TFA=transfemoral, TTA=transtibial, PAD=Peripheral Arterial Disease

5 Physiotherapy and Rehabilitation

5.1 Compression Therapy

Compression therapy of the residuum is widely used and figures for 2020-2024 are presented in Table 28. These figures capture the first method of compression used.

Table 28 Type of compression therapy used, 2020-2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Elset 'S' bandage	2	0.6%	1	0.3%	0	0%	0	0%	0	0%
Flowtron	2	0.6%	4	1.1%	0	0%	0	0%	0	0%
Plaster cast	82	23.4%	63	17.3%	75	17.2%	34	7.2%	35	7.4%
Shrinker sock	246	70.3%	278	76.4%	332	76.1%	416	88.5%	427	89.9%
Silicone Sleeve	2	0.6%	0	0%	2	0.5%	1	0.2%	1	0.2%
Other	1	0.3%	2	0.5%	2	0.5%	0	0%	0	0%
PPAM*	15	4.3%	16	4.4%	25	5.7%	19	4%	12	2.5%
Total	350	100%	364	100%	436	100%	470	100%	475	100%

Abbreviations= PPAM Aid= Pneumatic Post Amputation Mobility Aid

*Inclusion of PPAM aid here indicates it has been used without the walking frame for compression therapy only

Table 29 Type of compression therapy used by amputation level (limb fitted), 2024

	TTA (%)	TFA (%)	Bilateral TTA (%)
Plaster cast	6.7%	n/a	6.3%
Shrinker sock	89.8%	77.3%	87.5%
PPAM aid bag	2.4%	4.5%	6.3%
Unknown	0.8%	18.2%	0%

5.2 Early Walking Aids

The types of Early Walking Aids (EWA) used in 2020-2024 are shown in Table 30. Table 31 shows EWA used by amputation level; these figures relate to the first device used.

Table 30 Type of EWA used, 2020-2024

	2020		2021		2022		2023		2024	
	n	%	n	%	n	%	n	%	n	%
Femurett	34	12.7%	50	16.8%	51	13.4%	60	15.3%	61	14.3%
PPAM	232	86.6%	247	83.2%	331	86.6%	332	84.7%	366	85.7%
Other	2	0.7%	0	0%	0	0%	0	0%	0	0%
Total	268	100%	297	100%	382	100%	392	100%	427	100%

Abbreviations: PPAM= Pneumatic Post Amputation Mobility Aid

Table 31 Type of EWA used by amputation level (Limb-fitted), 2024

	TTA (%)	TFA (%)	Bilateral TTA (%)
PPAM aid	96.1%	30.3%	93.8%
Femurett	n/a	60.6%	n/a
Unknown	3.9%	9.1%	6.3%

Abbreviations: PPAM= Pneumatic Post Amputation Mobility Aid, TFA=transfemoral, TTA=transtibial

5.3 Mobility Outcomes: Locomotor Capabilities Index-5 (LCI-5)

The LCI-5 is a widely used and validated self-report tool that measures a lower limb amputee's locomotor capabilities with their prosthesis during and after rehabilitation ⁴.

The LCI-5 is an amended version of the LCI in which the upper ordinal level is split into 2 according to the use or non-use of walking aids to give maximum sub-scores of 28 and total score of 56 ⁵. The LCI-5 has been found to reduce the ceiling effect associated with the LCI by 50%^{5,6}. The higher the score of the LCI-5 the greater the capabilities of the amputee. The LCI-5 is completed retrospectively for the amputee patient's mobility six months prior to their amputation and prospectively on final discharge. The difference between these two scores is calculated for each patient to give a score for their change in mobility. A positive score indicates an improvement in mobility and a negative score deterioration. All Basic and Advanced values in the tables below are the **mean** values.

Table 32 Locomotor Capabilities Index by level, 2020 - 2024

2020	6/12 Pre-amp			Final Outcome			
	Basic	Adv.	Total	Basic	Adv.	Total	Change
Transtibial (n=165)	24	20	44	20	16	36	-8
Transfemoral (n=40)	25	23	48	20	13	33	-15
Bilateral transtibial (n= 24)	23	20	43	18	11	29	-14
2021	6/12 Pre-amp			Final Outcome			
	Basic	Adv.	Total	Basic	Adv.	Total	Change
Transtibial (n=193)	25	22	47	21	17	38	-9
Transfemoral (n=68)	25	22	47	19	13	32	-15
Bilateral transtibial (n= 18)	24	19	43	20	12	31	-12
2022	6/12 Pre-amp			Final Outcome			
	Basic	Adv.	Total	Basic	Adv.	Total	Change
Transtibial (n=216)	24	21	45	21	17	38	-7
Transfemoral (n=37)	25	23	48	18	14	32	-16
Bilateral transtibial (n=32)	23	18	42	18	13	31	-11
2023	6/12 Pre-amp			Final Outcome			
	Basic	Adv.	Total	Basic	Adv.	Total	Change
Transtibial (n=208)	24	21	46	21	17	37	-6.5
Transfemoral (n=59)	26	24	50	19	13	32	-15
Bilateral transtibial (n=27)	24	21	45	21.5	17	38	-3
2024	6/12 Pre-amp			Final Outcome			
	Basic	Adv.	Total	Basic	Adv.	Total	Change
Transtibial (n=238)	25	23	48	22	18	39.5	-8.5
Transfemoral (n=60)	25	23	48	19	13	33	-15
Bilateral transtibial (n=29)	23	20	44	20	15	36	-8

6 Milestone Data

6.1 Statistics Presented

This section of the report deals with the statistical analysis of the rehabilitation milestones. The four rehabilitation milestones are shown in the figure below: -

Milestones	Names by which milestones are referred to in this report
<i>Number of days from final amputation to casting for prosthesis</i>	<i>'Days to casting'</i>
<i>Number of days from casting to delivery of prosthesis</i> where delivery is defined as the date at which the patient begins gait training with the prosthesis – finished or unfinished.	<i>'Casting to delivery'</i>
<i>Number of days from primary amputation to inpatient discharge</i> (for patients having bilateral amputations and/or revision surgery see notes below)	<i>'Days to inpatient discharge'</i> (Length of stay)
<i>Number of days from inpatient discharge to discharge from outpatient physiotherapy</i>	<i>'Days inpatient discharge to outpatient discharge'</i>

Figure 1 Rehabilitation Milestones

For each milestone, the following descriptive statistics are presented: the number of amputees included in the analysis, median, upper and lower quartile.

Only those who were limb-fitted at outpatient discharge are included in *days to casting* and *casting to delivery*.

Where amputees have undergone revisions or re-amputations, the latest date of surgery is used as the date of amputation. The final level, in the case of re-amputations to higher levels, is used to group for this milestone.

Days to inpatient discharge is the length of stay in hospital for each amputee calculated in days from the date of amputation. The length of stay for those with bilateral amputations in same hospital admission is calculated from the date of first surgery.

The length of hospital stay for those re-amputated to a higher level will be calculated from the date of their first amputation.

For each milestone, and each group, the statistics represent available data including data from those who have died.

Groups with results prepared for all milestones	Additional groups for <i>days to inpatient discharge</i>
Transtibial Unilateral Fitted	Transtibial Unilateral Not Fitted
Transfemoral Unilateral Fitted	Transfemoral Unilateral Not Fitted
Bilateral* Fitted	Bilateral* Not Fitted

Figure 2 Groups in milestones

*Bilateral includes all those who underwent one amputation in the report period having had a prior amputation(s), and those who underwent bilateral amputations in the report period having had no prior amputations

6.2 Days to Casting

Table 33 Days to casting milestone, descriptive statistics, 2024.

	All	Unilateral TTA	Unilateral TFA	Bilateral TTA	TTA & TFA
Number Included	413	275	78	37	6
Lower Quartile (days)	30	28	38	31.5	35
Upper Quartile (days)	83.5	75	104	51.5	209
Median (days)	46	41	67	40	79

Abbreviations: TFA=transfemoral, TTA=transtibial

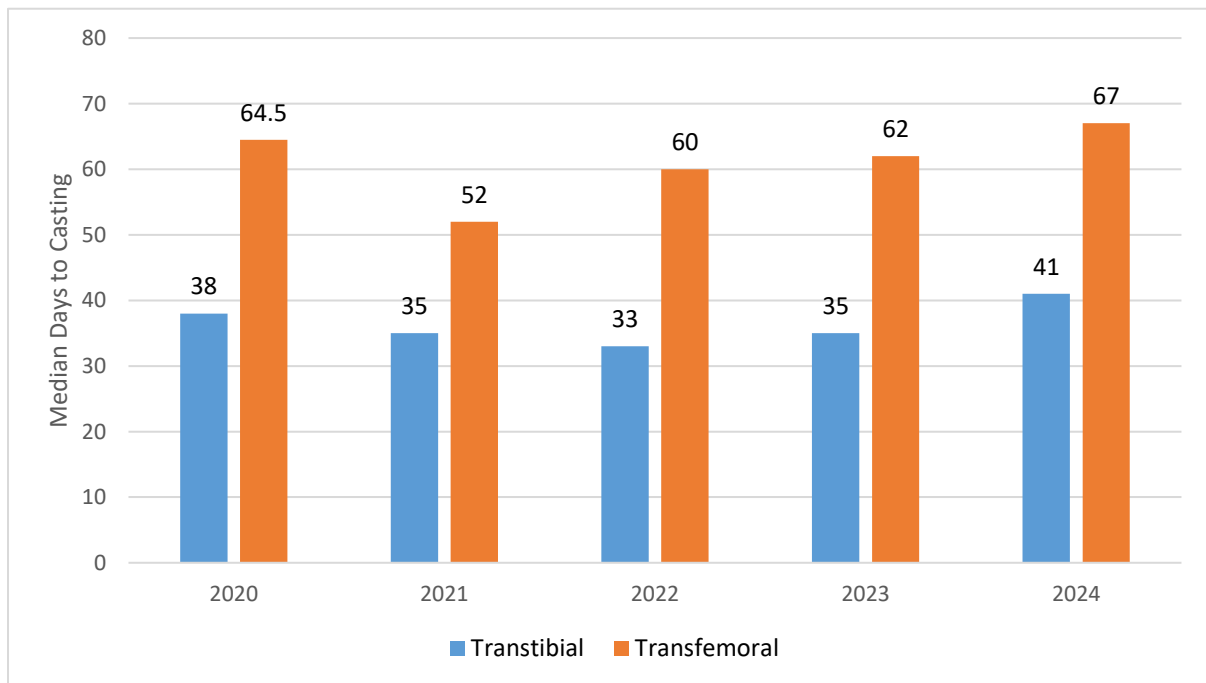


Figure 3 Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2020-2024

6.3 Casting to Delivery

Table 34 Casting to delivery milestone, descriptive statistics, 2024

	All	Unilateral TTA	Unilateral TFA	Bilateral TTA	TTA & TFA
Number Included	411	274	77	37	6
Lower Quartile (days)	10	9	14	9.5	7.5
Upper Quartile (days)	19	16	16	18.5	121
Median (days)	14	14	14	14	18

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 35 Median casting to delivery milestone, 2020-2024

	2020	2021	2022	2023	2024
TTA (days)	7	7	7	14	14
TFA (days)	7	9	14	14	14

Abbreviations: TFA=transfemoral, TTA=transtibial

6.4 Days to Inpatient Discharge: Fitted with a Prosthesis

Table 36 Days to in-patient discharge, limb-fitted, descriptive statistics, 2024

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	254	66	32
Lower Quartile (days)	19	23	14
Upper Quartile (days)	58	88	78
Median (days)	33.5	41	29

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 37 Median days to in-patient discharge, limb-fitted, 2020-2024 (Unilateral Only)

	2020	2021	2022	2023	2024
TTA	32	38	37	37	33.5
TFA	26	28.5	35	35	41

Abbreviations: TFA=transfemoral, TTA=transtibial

6.5 Days to Inpatient Discharge: Not Fitted with a Prosthesis.

Table 38 Days to in-patient discharge, patients' not limb-fitted, descriptive statistics, 2024.

	Unilateral TTA	Unilateral TFA	Bilateral TTA	Bilateral TFA	TTA & TFA
Number Included	80	188	27	44	16
Lower Quartile (days)	23.5	24	17	15	9
Upper Quartile (days)	88	80.5	83	79	60
Median (days)	50	48.5	34	33.5	27.5

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 39 Median days to in-patient discharge, patients not limb-fitted, 2020-2024 (Unilateral Only)

	2020	2021	2022	2023	2024
TTA (days)	39	51	38	63	50
TFA (days)	36	36	47	50	48.5

Abbreviations: TFA=transfemoral, TTA=transtibial

6.6 Days from in-patient to out-patient discharge: Limb-fitted

Table 40 shows the days from inpatient discharge to outpatient discharge (length of outpatient rehabilitation) for all limb-fitted patients 2024; however, this does not consider the frequency or type of rehabilitation which will vary from hospital to hospital. The different models of care are described in Section 9.

Table 40 Days from in-patient discharge to out-patient discharge, limb-fitted, 2024

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	254	66	32
Lower Quartile	53.5	92	80
Upper Quartile	183.5	273	187
Median	121	164	122

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 41 Median Days from in-patient discharge to outpatient discharge, limb-fitted 2020
- 2024**

	2020	2021	2022	2023	2024
TTA (days)	91	79	92	113	121
TFA (days)	141	181	175	167.5	164
Bilateral (days)	74	51	142	93	122

7 Trends in Compression Therapy and Early Walking Aids (EWAs)

7.1 Statistics Presented

This chapter looks at trends in the use of compression therapy and Early Walking Aids (EWAs). All patients receiving compression therapy or EWA therapy are included in each analysis.

7.2 Trends in Compression Therapy

Of the patients receiving compression therapy, the percentage who received it within 10 days of amputation is shown in Table 42 for 2020-2024. A line chart representing this data is shown in Figure 4

Table 42 Patients receiving compression therapy within 10 days of amputation (%), 2020 - 2024.

	2020	2021	2022	2023	2024
TTA	69.7	70	77	69	64
TFA	42.2	47.6	60	46	41

Abbreviations: TFA=transfemoral, TTA=transtibial

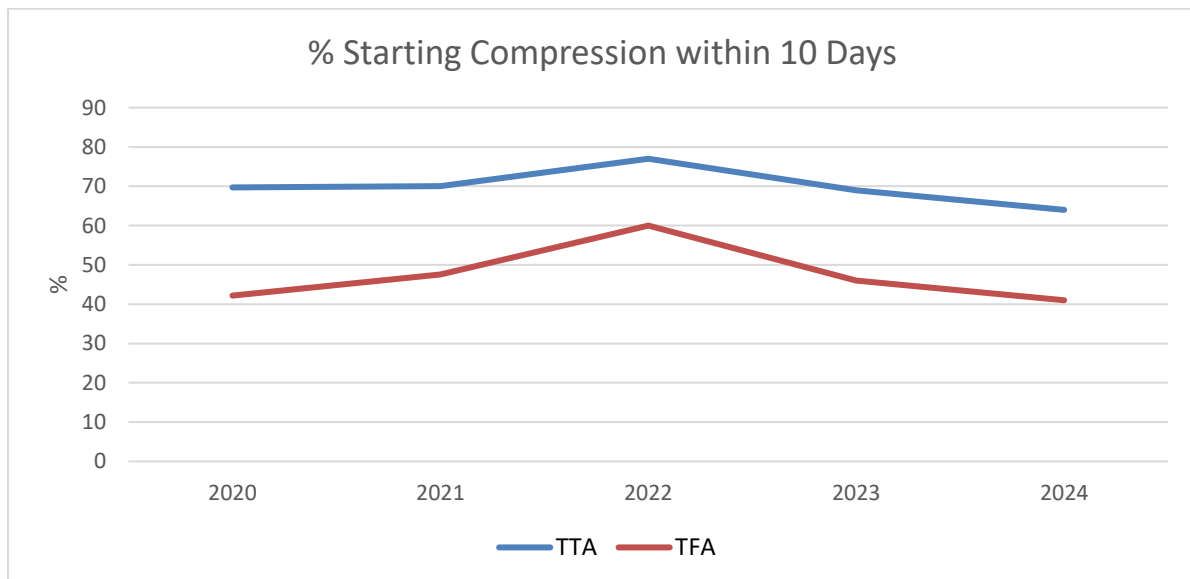


Figure 4 Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2020 - 2024.

7.3 Trends in Early Walking Aids

Table 43 shows the percentage of those who received Early Walking Aid (EWA) therapy within 10 days of amputation surgery for 2020 - 2024, categorised by level of amputation. Note this only includes patients who received EWA therapy. A line chart representing this data is shown in Figure 5

Table 43 Patients using EWAs within 10 days of amputation (%), 2020 - 2024.

	2020	2021	2022	2023	2024
TTA	43.2	39.3	34	34	34
TFA	20.3	19.7	19	11	17

Abbreviations: TFA=transfemoral, TTA=transtibial

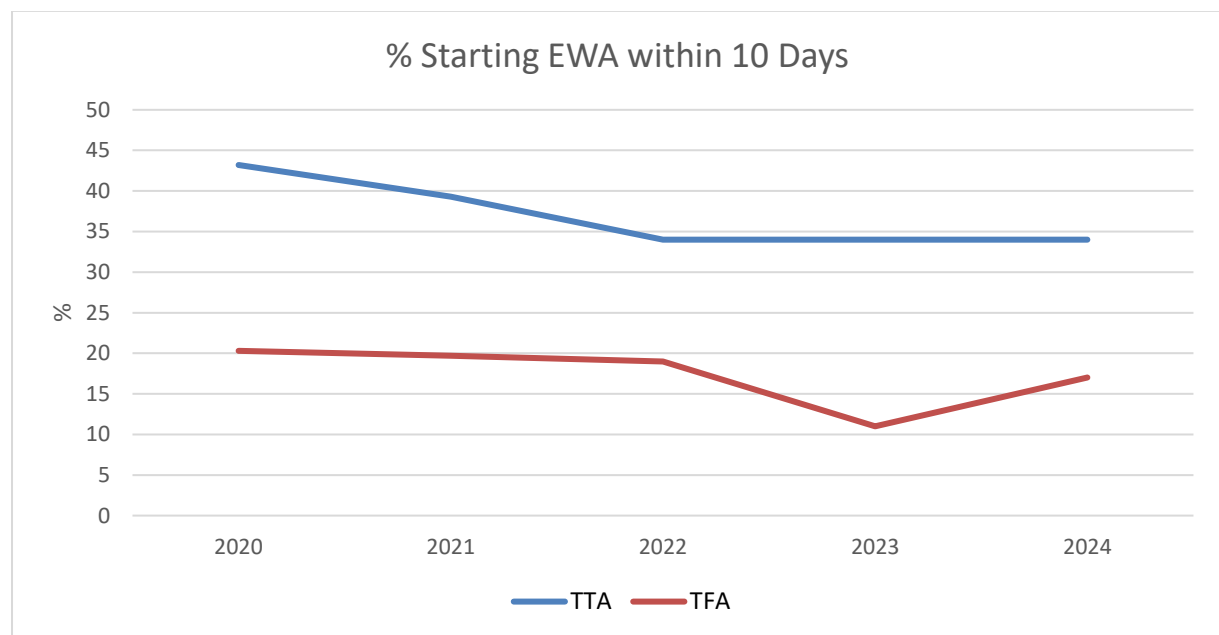


Figure 5 Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2020 - 2024.

8 Limb -fitting Centres

8.1 Hospital to Limb fitting centre

Each of the five limb-fitting centres receives referrals depending upon their geographical location. Table 44 shows which limb-fitting centre each hospital refers to; the number of amputees in 2024 from each hospital, and the percentage successfully limb-fitted at each centre categorised into unilateral transtibial (TTA) and unilateral transfemoral (TFA) level.

Table 44 Limb-fitting centres, referring hospitals and % limb-fitted, 2024.

Limb-fitting Centres (LFC)	Referring hospital (n= number of TTA & TFA)	% Limb-fitted Unilateral TTA	% Limb-fitted Unilateral TFA
WestMARC (n=368) NHS GG&C NHS Forth Valley NHS D&G NHS Lanarkshire NHS A&A	Queen Elizabeth University Hospital (n=212)	59%	26%
	Glasgow Royal Infirmary (n=16)	67%	50%
	Royal Alexandria Hospital (n=1)	100%	n/a
	Monklands University Hospital (n=0)	n/a	n/a
	Wishaw General Hospital (n=2)	100%	0%
	Hairmyres Hospital (n=136)	67%	8%
	Forth Valley Royal Hospital (n=0)	n/a	n/a
	Dumfries and Galloway Royal Infirmary (n=1)	n/a	0%
	Golden Jubilee National Hospital (n=1)	n/a	0%
	Western Isles (n=0)	n/a	n/a
Ayr (n=12) WestMARC satellite clinic	Ayr University Hospital (n=12)	80%	0%
SMART (n=120) NHS Lothian NHS Borders	Royal Infirmary of Edinburgh (n=120)	65%	24.5%
	St John's Hospital, Livingstone (n=0)	n/a	n/a
	Borders General (n=0)	n/a	n/a
TORT (n=98) NHS Tayside NHS Fife	Ninewells Hospital (n=98)	79%	13%
	Victoria Hospital, Kirkcaldy (n=0)	n/a	n/a
Raigmore (n=35) NHS Highland	Raigmore Hospital (n=35)	64%	57%
MARS (n=60) NHS Grampian	Aberdeen Royal Infirmary (n=60)	71%	26%
	Woodend Hospital (n=0)	n/a	n/a

Abbreviations: TFA=transfemoral, TTA=transtibial,

8.2 Milestones by Limb-fitting centre

The number of, and milestones data for limb-fitted unilateral TTA are presented for each hospital in Table 46 for 2024.

Table 45 Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre, 2024

Limb fitting Centre	Number	Days to Casting	Days to Delivery
WestMARC (NHS GG&C)	139	41	57
Ayr (satellite clinic of WestMARC)	9	59	74
SMART	49	58	76
TORT	43	34	50
Raigmore	19	24	28
MARS	15	61	82
National Median	275	41	58.5

*there is one external patient not included in the national median in 2024

Definitions:

Days to casting

Median days from final surgery to casting for prosthesis.

Days casting to delivery

Median days from final surgery to delivery of prosthesis

9 Models of Care

Each hospital's model of care (MOC) varies and the impact this has on the achievement of rehabilitation milestones and outcomes is complex and influenced by many factors including patient demographics (see Table 47). Hebenton et al 2019 identified key aspects of services that appear to improve speed and outcomes of rehabilitation after lower limb amputation¹. These key aspects have been used to develop the weighted MOC scoring system used in this report.

Table 46 MOC Scoring system

MOC	Descriptor	Score
Immediate post-operative rigid dressing	0 = not used 1 = used with some patients 2 = used routinely	2
Specialist physiotherapy in first 14 days	0 = non-specialist physio 1 = non-specialist supported by specialist e.g. in-reach 2 = specialist physio	2
Daily inpatient gym session (Mon- Fri)	0 = no gym sessions 1 = gym sessions 2-3 per week or daily ward sessions 2 = daily gym sessions	2
Inpatient gym session ≥ 1 hour	0 = < 60 mins 1 = ≥ 60 minutes	1
Prosthetic Service on site when in patient	0 = on site 1 = not on site	1
Prosthetic provision as an in patient LF = limb fitted, IP =inpatient, OP = outpatient	0 = LF as OP 1 = some patients LF as IP and/or all patients cast as IP 2 = all patients LF as IP	2
Routine specialist outpatient physiotherapy service	0 = not routine 1 = routine	1
Maximum score		11

Aspects found to be statistically significant in previous study² have been given a higher rating i.e. 2
Score < optimum means aspect is only partially available

Section 9.1 includes each of the major centres Model of Care descriptor and their MOC score (as per the table above).

Each centres unilateral transtibial milestone data, for the last 5 years (2019 – 2023), is also included in this section, with the exception of Grampian.

9.1 Individual Hospital data

9.1.1 Vascular Centralisation in Scotland

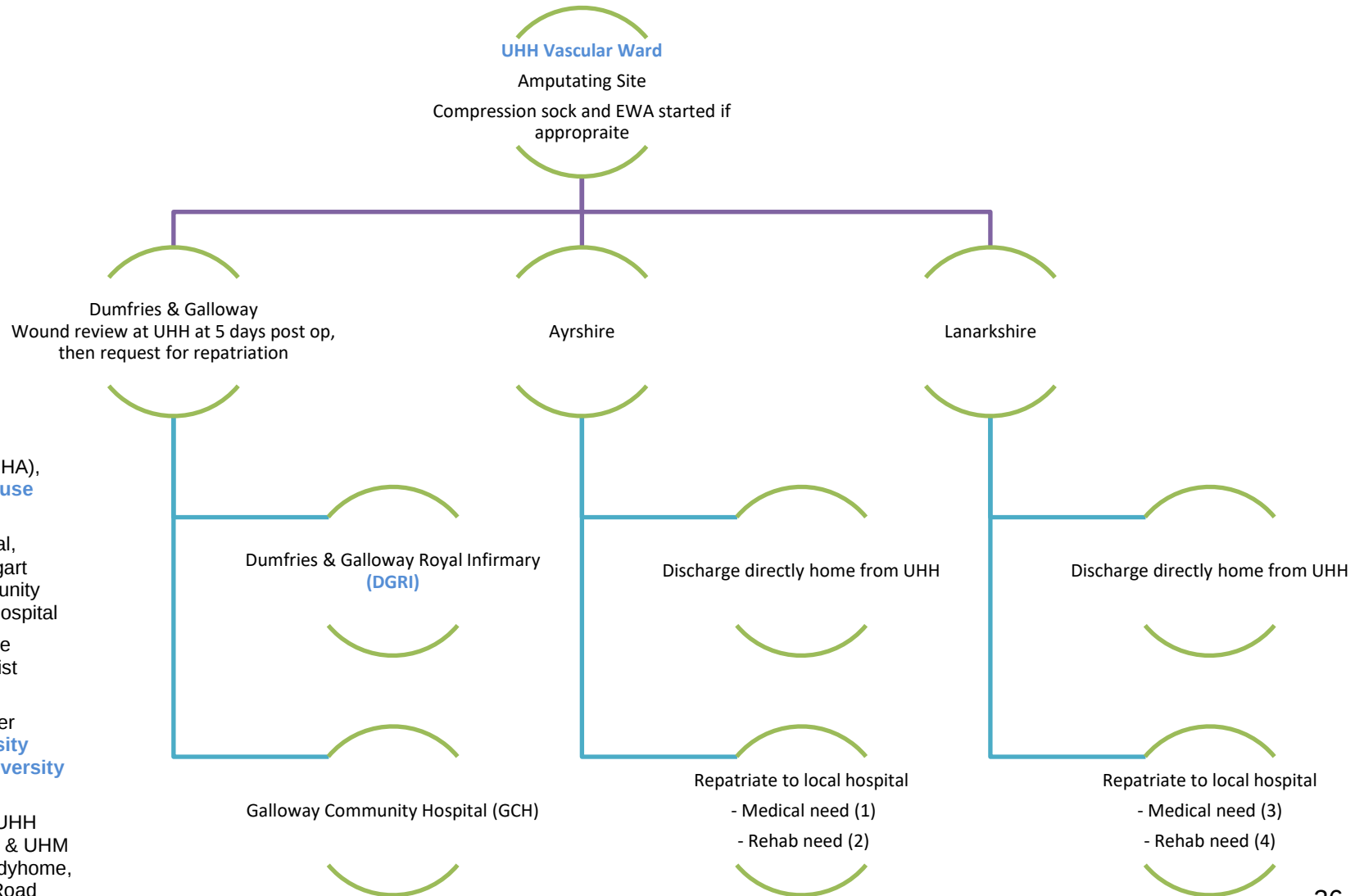
In early 2019, the vascular unit at Forth Valley Royal Hospital (FVRH) moved to Queen Elizabeth University Hospital (QEUH). Following this all patients requiring amputation surgery, which had previously been performed in FVRH, were transferred to QEUH, and then repatriated to FVRH, to continue their rehabilitation. The majority of patients, who are assessed as suitable for limb-fitting commence compression therapy (CT) and early walking aid (EWA) use while at QEUH (7 -10 days post-surgery) prior to repatriation.

Since 1st August 2022 all vascular surgery at NHS Ayrshire & Arran, Dumfries & Galloway and Lanarkshire has been moved to University Hospital Hairmyres (UHH). The majority of patients, who are assessed as suitable for limb-fitting commence CT and EWA use while at UHH (7 -10 days post-surgery). Patients from Dumfries & Galloway are routinely referred for repatriation following a wound review at day 5. Patients from Ayr and Lanarkshire are usually discharged home unless there is ongoing medical/rehabilitation need in which case they are also referred for repatriation. Those who are discharged home and appropriate for limb fitting are referred to their local outpatient team for ongoing assessment and treatment.

For patients amputated at QEUH there are two main prosthetic rehabilitation pathways for limb fitters – either at WestMARC, or Forth Valley. Following amputation at UHH there are five main prosthetic rehabilitation pathways at Hairmyres, Wishaw, Monklands, Ayr and D&G. The differing milestones for each pathway are documented in section 9.1.1

9.1.1.1 University Hospital Hairmyres (UHH) centralisation: Inpatient Pathway

Blue text = Specialist Amputee Physiotherapist on site



1. University Hospital Ayr (UHA), University Hospital Crosshouse (UHC)

2. Arran War Memorial Hospital, Ayrshire Central Hospital, Biggart Hospital, East Ayrshire Community Hospital, Girvan Community Hospital

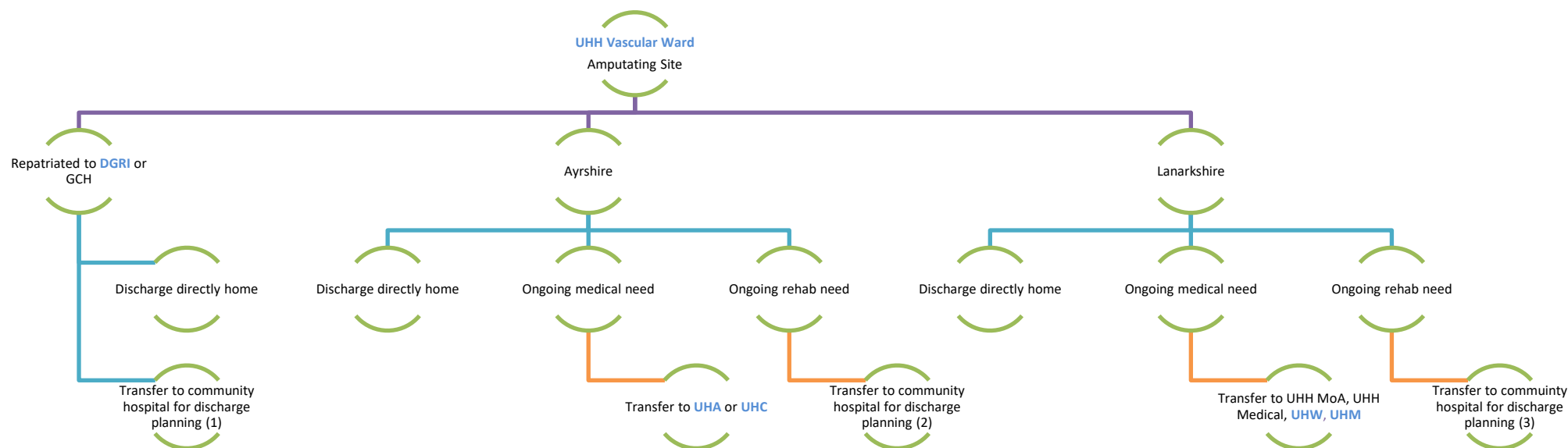
All Ayrshire hospital sites have vascular in-reach from specialist physiotherapist

3. UHH MoA (Medicine for older adults), UHH Medical, University Hospital Wishaw (UHW), University Hospital Monklands (UHM)

4. Stonehouse, Blantyre Life, UHH MoA, UHW, UHM. From UHW & UHM may have further moves to Ladyhome, Kello, Wester Moffat, Airbles Road

9.1.1.2 University Hospital Hairmyres (UHH) Non Limb Fitting Pathway

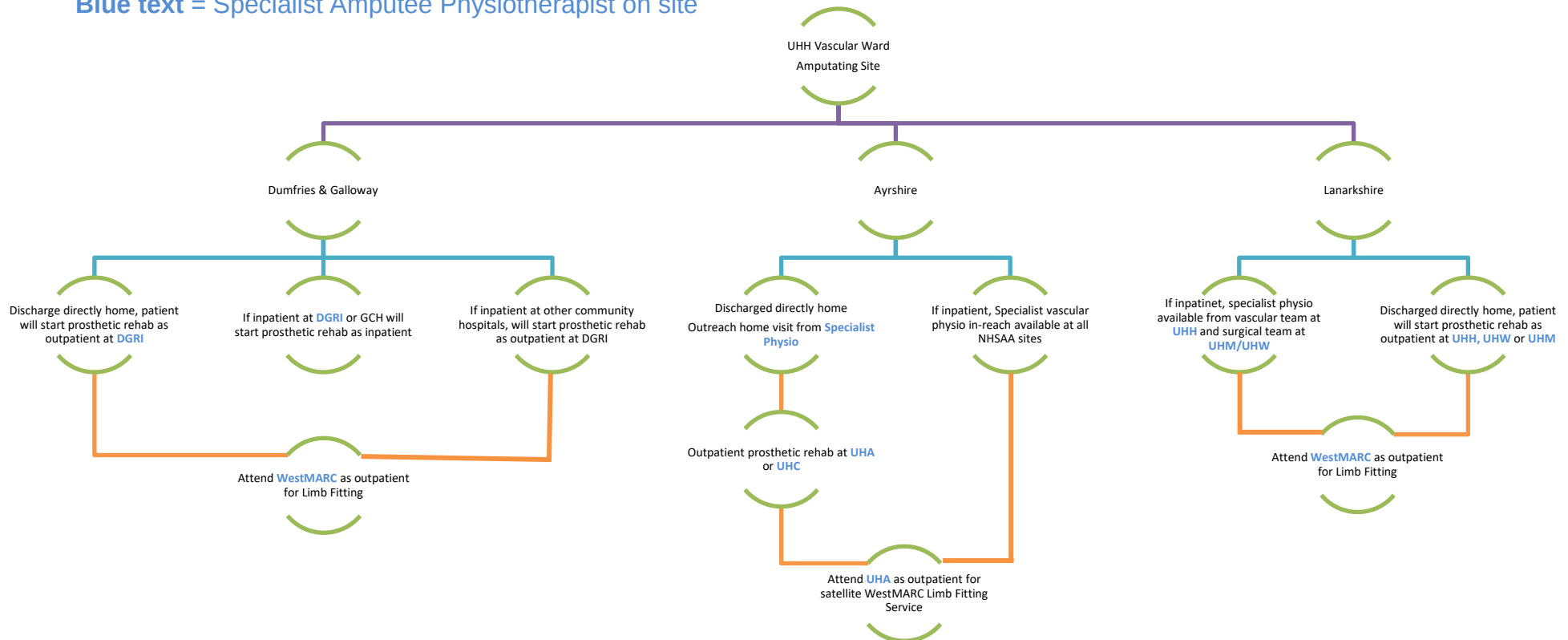
Blue text = Specialist Amputee Physiotherapist on site



1. Annan, Castle Douglas, Lochmaben, Langholm
2. Arran War Memorial Hospital, Ayrshire Central Hospital, Biggart Hospital, East Ayrshire Community Hospital, Girvan Community Hospital – Specialist vascular physio in-reach available at all sites
3. Stonehouse, Blantyre Life, UHH MoA, **UHW, UHM** (surgical wards will have specialist input). From UHW & UHM may have further moves to Ladyhome, Kello, Wester Moffat, Airbles Road

9.1.1.3 University Hospital Hairmyres (UHH) Limb Fitting Pathway

Blue text = Specialist Amputee Physiotherapist on site



Model of Care

- Dumfries & Galloway Royal Infirmary – 2-3 sessions per week – 1 hour
- University Hospital Ayr– 2 session per week – 1.5 hours
- Ayrshire Central Hospital – 2 session per week – 1.5 hour
- University Hospital Hairmyres - 1 session per week – 1 hour
- University Hospital Monklands - 1 session per week – 40 minutes
- University Hospital Wishaw - 1 session per week – 1 hour

9.1.2 Patient Journey – Centralised Services

Queen Elizabeth University Hospital - Patient journey

The graphs below highlight the difference in patient journey for **unilateral transtibial** patients who go on to attend prosthetic rehabilitation (i.e. limb fit) at either FVRH or WestMARC, following amputation at QEUH. All outliers have been removed i.e. Ayr, Highlands, Argyll. The length of rehab refers to inpatient discharge date to outpatient discharge date.

In 2024, 62 patients were removed from the QEUH patient journey as they did not attend either FVRH or QEUH for their outpatient rehabilitation.

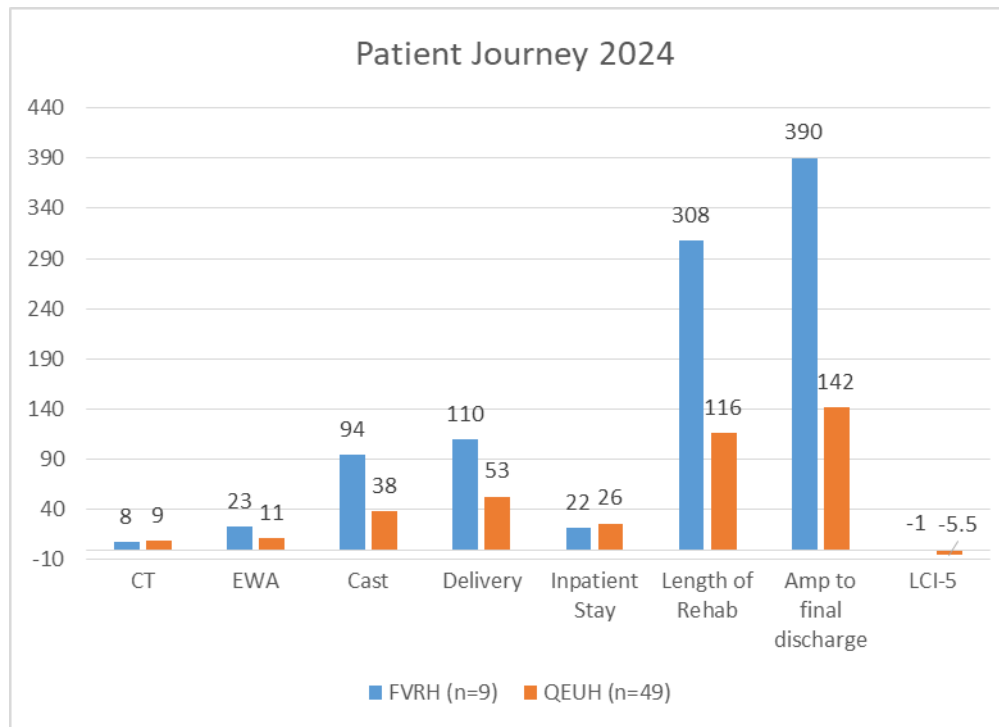


Figure 6: Median days to milestones – QEUH Patient Journey

University Hospital Hairmyres – Patient Journey

The graphs below highlight the difference in patient journey for unilateral transtibial patients who go on to limb fit following amputation at UHH.

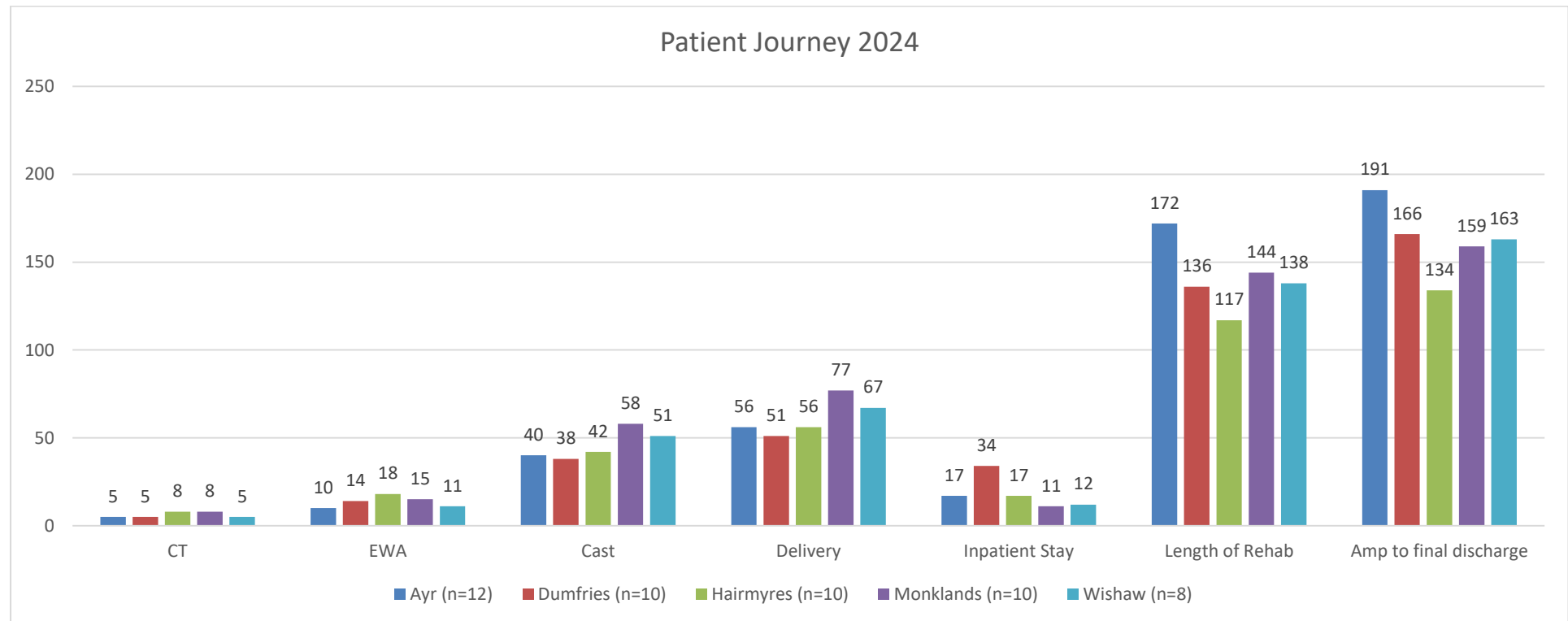


Figure 7: Median days to milestones – UHH Patient Journey

9.1.3 Aberdeen Royal Infirmary (ARI), NHS Grampian

Rehabilitation 'Primary' loop:

- On referral from medical staff, patients are offered an early pre amputation home visit with OT and physiotherapy staff
- Immediate post-operative rigid dressings are not routinely used
- Patients will receive treatment from a specialist physiotherapist, initially at ARI. (2) Those suitable for limb fitting will move to a 6 bedded rehab unit at Woodend Hospital.
- Patients who are assessed as suitable for prosthetic fitting will have physiotherapy in the form of gym-based sessions (both 1:1 and group sessions), routinely receiving one treatment session five days a week (2), with an average session lasting 45 minutes.
- Physiotherapy is provided at Woodend by clinical staff travelling from ARI to Woodend daily and a permanent 0.4 HCSW on site.
- Prosthetic Service, MARS is located on site at Woodend Hospital (1)
- Patients are routinely discharged after prosthetic fitting (2) with follow up as required via clinic at Woodend, community teams or Horizon's specialist service.
- Prosthetic candidates will have access to physiotherapy after discharge as required. The level of input is dependent on geography and ongoing rehabilitation goals. Local patients may access specialist physiotherapist up to two times a week. When geography necessitates non-specialist physiotherapy input, the physiotherapist will be supported by the prosthetic centre. Patients can be re-admitted to 6 bedded unit for 1-3 weeks intensive rehabilitation, five days a week.
- Patients who are not appropriate for prosthetic fitting will receive physiotherapy in the form of both gym based and ward sessions. These will be both 1:1 and in group settings. Patients will routinely receive 1 treatment session 3 days a week with an average session lasting 30 minutes. Following discharge from hospital physiotherapy will be provided as required by community non-specialist staff.

MOC=7/11

Rehabilitation 'home first' loop:

- Patients with delayed healing or other issues may be discharged home with support from outpatient specialist service and community rural teams
- Once healed and deemed appropriate for prosthetic provision patients will undertake pre-prosthetic EWA training via Horizons Rehabilitation Centre if they have transport or Community Rural Teams who have access to parallel bars. If none of these are available to the patient or patient has complex needs then they will be re-admitted to Links unit for assessment and provision of prosthetic
- Pre prosthetic Rehabilitation in Out Patient service is limited by staffing and transport but normally patient can access 2 x 1 hour sessions a week delivery via 0.6 WTE band 7 physiotherapist permanent; Loose access to Band 6 one day a week if available. Community Rural Settings normally are limited to once a week for one hour with clinicians varying in banding and experience. Additional support for these teams is given via the specialist teams at ARI and Horizons

Milestone data following Unilateral Transtibial Amputation (2024)

Aberdeen Royal Infirmary - Unilateral Transtibial Milestones								
	Limb- fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2024	15	17	26	61	82	86	112	-3

9.1.4 University Hospital Ayr and University Hospital Crosshouse, NHS Ayrshire & Arran

- Vascular patients no longer routinely have surgery in an Ayrshire Hospital (centralisation to Hairmyres as described above).
- Orthopaedic surgeons still perform amputations for their patients in Ayrshire, either at University Hospital Ayr or University Hospital Crosshouse.
- Immediate post-operative rigid dressings are not routinely used.
- Following an amputation patients in NHSAA will receive treatment from a specialist physiotherapist with support from a non-specialist physiotherapist (2).
- In patient treatment will be delivered as both one-to-one and group-based sessions (pending caseload). These will take place both on the ward and in the therapy gym. Patients will routinely receive one treatment session most days (1), with average treatment time lasting 60 minutes (1).
- The Prosthetic service is delivered by a satellite clinic held at Ayr Hospital (1).
- Patients who are appropriate for prosthetic-review will routinely be discharged before their first casting.
- Once discharged from in-patient care, prosthetic candidates will have access to out-patient physiotherapy at one of two locations (Ayr Hospital or Ayrshire Central Hospital in Irvine). They will see a specialist physiotherapist (1) twice a week and have access to outreach community physiotherapy.
- Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge unless required. When required, their physiotherapy input will occur via a domiciliary service.

MOC=6/11

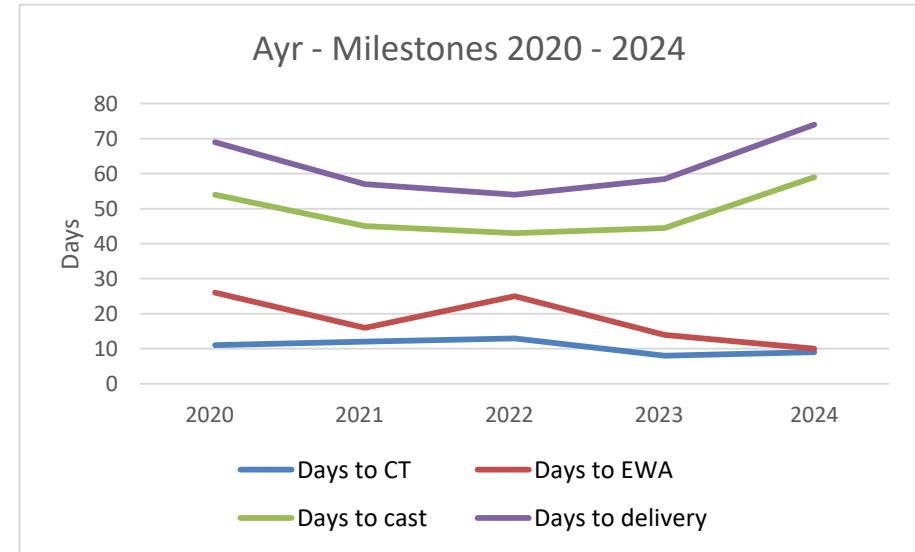
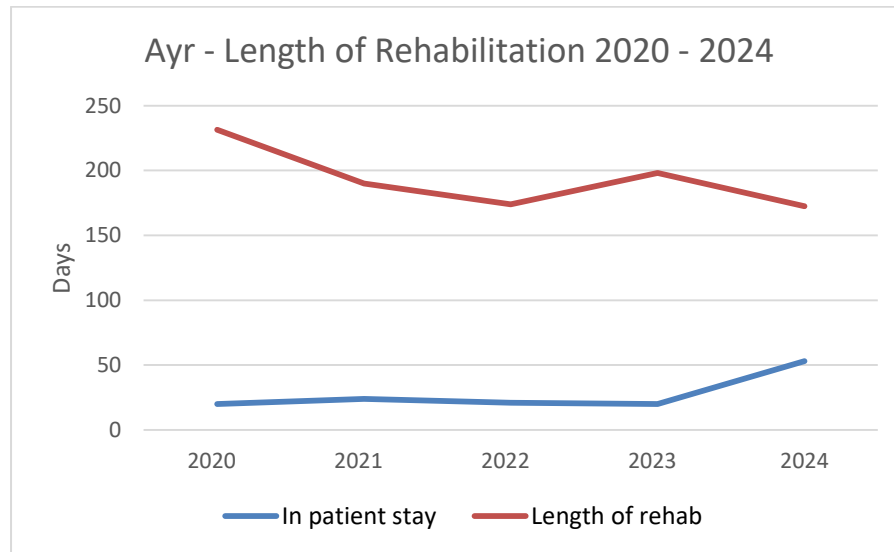
It should be noted that from 2023 there is no vascular surgery at University Hospital Ayr

The milestones from 2023 onwards are for those patients who still had their amputation in an Ayrshire hospital. All Ayrshire patients who were amputated at UHH are presented under the UHH milestone data.

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

University Hospital Ayr – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	14	11	26	54	69	20	232	-13
2021	7	12	16	45	57	24	190	-7
2022	14	13	25	43	54	21	174	-10
2023	7	8	14	45	59	20	198	2
2024	8	9	10	59	74	53	173	-3

CT – Compression Therapy, EWA – Early Walking Aid.



9.1.5 Glasgow Royal Infirmary (GRI), NHS Greater Glasgow & Clyde

- Immediate post-operative rigid dressings are not routinely used
- Following an amputation, patients at GRI will receive treatment from a non-specialist physiotherapist. Rehabilitation will occur in their amputating bed
- In-patient, physiotherapy will take the form one-to-one sessions. These will take place on the ward (no gym/ group treatment as an inpatient). Patients will routinely receive one treatment session daily, Monday to Friday (1), with average treatment time lasting 30 minutes. There is provision for rehabilitation at the weekend as required.
- The Prosthetic service is delivered from WestMARC.
- Patients who are appropriate for prosthetic-review will routinely be discharged before their first casting.
- Prosthetic candidates will have access to out-patient physiotherapy follow-up at WestMARC, their nearest limb-fitting centre. They will see a specialist physiotherapist (1) once a week, have access to a second group session if appropriate and have access to community outreach, clinical psychology and specialist OT services.
- Patients who are not appropriate for prosthetics will receive the same level of in-patient input, but do not routinely have access to out-patient physiotherapy follow-up unless required.

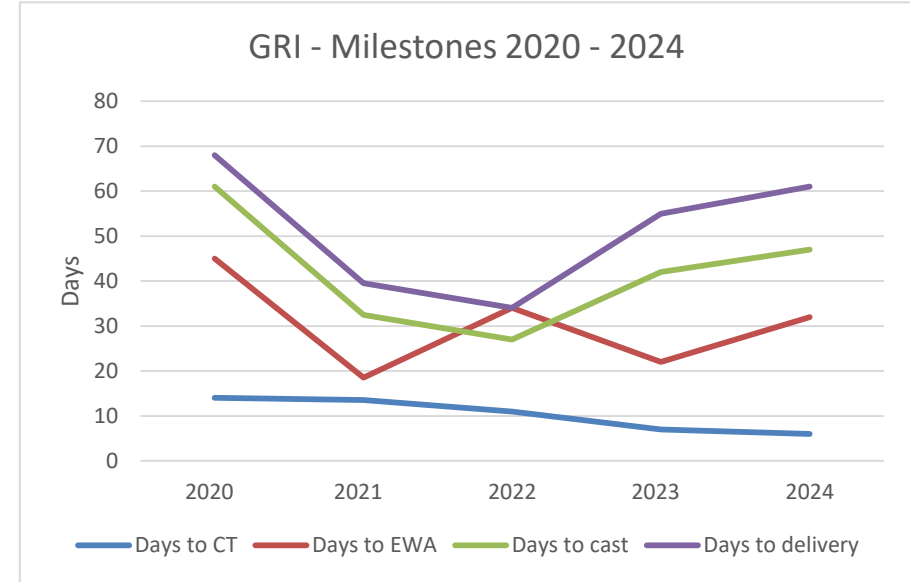
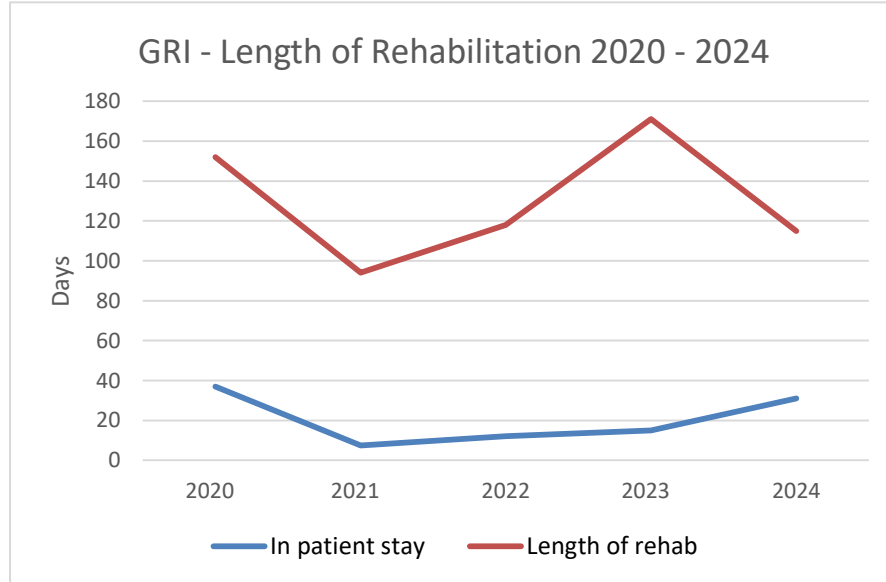
MOC = 2/11

It should be noted that there is no vascular surgery at GRI.

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

Glasgow Royal Infirmary – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 change
2020	9	14	45	61	68	37	152	-8
2021	8	14	19	33	40	7.5	94	-3
2022	5	11	34	27	34	12	118	-1
2023	12	7	22	42	55	15	171	0.5
2024	4	6	32	47	61	31	115	-2

CT – Compression Therapy, EWA – Early Walking



9.1.6 Royal Infirmary Edinburgh (RIE) / Astley Ainslie Hospital, NHS Lothian

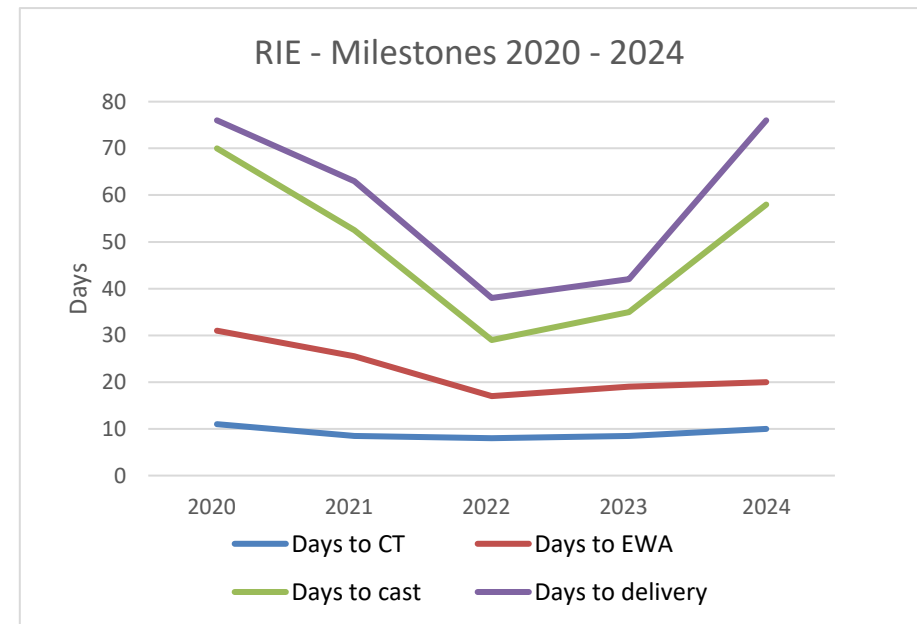
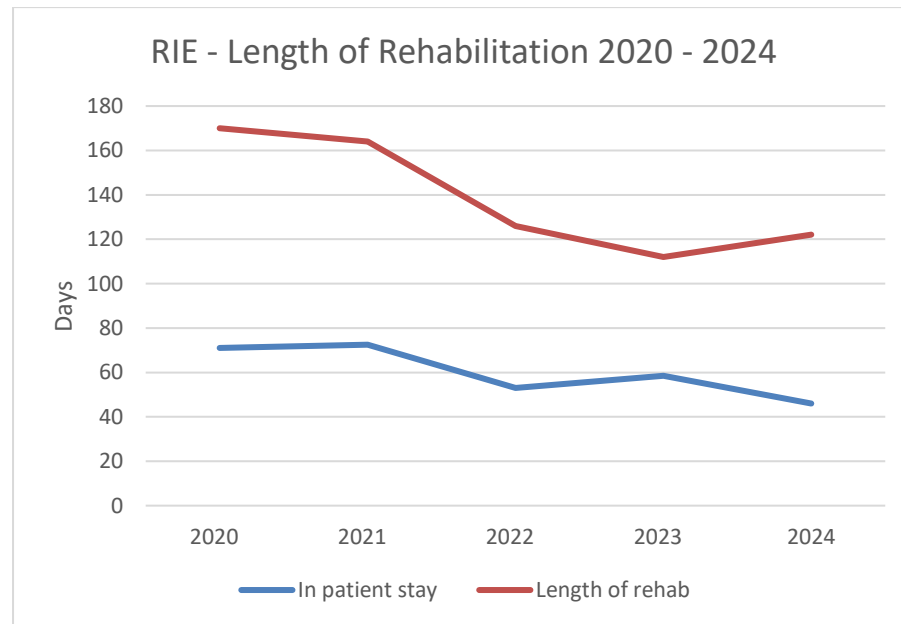
- Immediate post-operative rigid dressings are not routinely used
- Following amputation, patients at RIE will receive treatment from a non-specialist static physiotherapist. They will be reviewed by the in-reach team from Astley Ainslie Hospital and those who are appropriate for prosthetic review will be transferred to a rehabilitation bed at AAH from 7 – 21 days post op, where they will receive treatment from a specialist physiotherapist (1)
- Patients who choose to go home from the Acute hospital can be seen as an outpatients at AAH for assessment and prosthetic rehabilitation from 1 week post discharge from the acute hospital.
- As an inpatient at RIE, physiotherapy sessions are delivered x 2 per week by the in-reach physiotherapists and occasional ward sessions may be provided by the surgical team. Following transfer to AAH, physiotherapy will take the form of one-to-one sessions based mainly in a physiotherapy gym. Patients will receive up to three sessions daily, Monday to Friday (2), with an average total daily treatment time lasting 60 minutes (1).
- Patients can be sent home to heal and may be readmitted for rehabilitation and prosthetic fitting or may attend as an outpatient.
- The Prosthetic service is delivered from SMART, which is on-site at Astley Ainsley (1).
- Patients will routinely be discharged home after prosthetic fitting (2).
- Outpatient physiotherapy is provided routinely as required (1). All prosthetic patients will be reviewed in an MDT clinic 6 weeks after discharge.
- Physiotherapy input for in-patients not proceeding with prosthetic fitting will be gauged in accordance with specific rehab goals. On discharge, these patients do not routinely have access to out-patient physiotherapy

MOC = 8/11

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

Royal Infirmary of Edinburgh/ Astley Ainsley Hospital – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	27	11	31	70	76	71	170	-10
2021	26	9	26	53	63	73	164	-8
2022	47	8	17	29	38	53	126	-4
2023	30	9	19	35	42	59	112	-6
2024	46	10	20	58	76	46	122	-11

CT – Compression Therapy, EWA – Early Walking Aid



9.1.7 Raigmore Hospital, NHS Highland

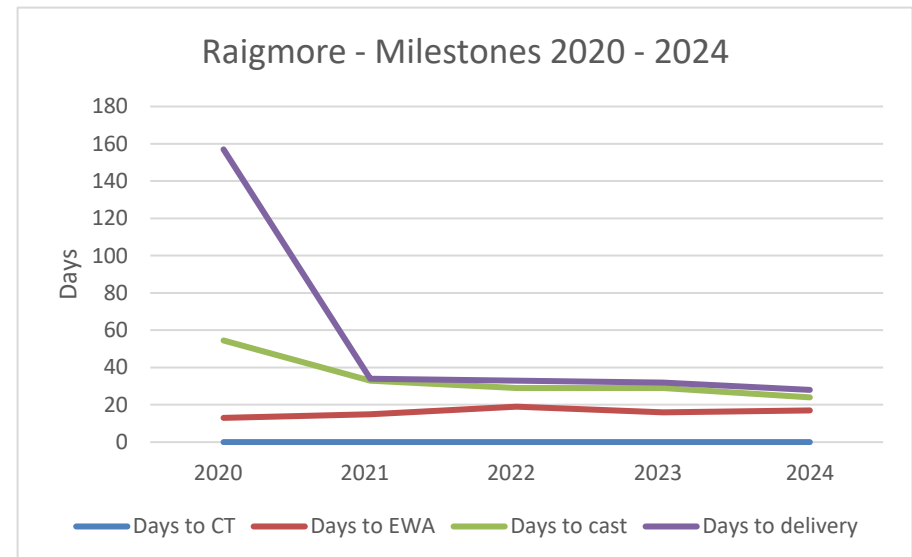
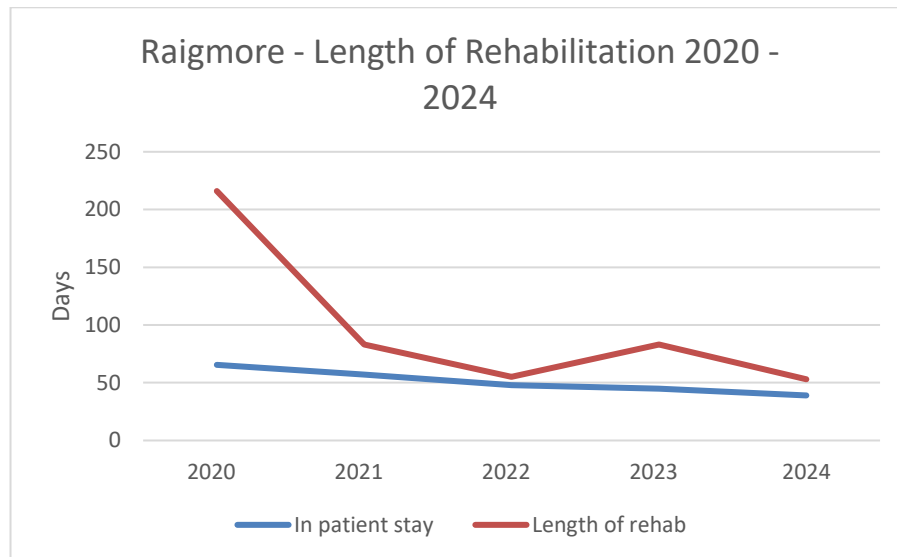
- Immediate post-operative rigid dressings are used with some patients (1).
- Following an amputation, patients at Raigmore Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will take the form of both one-to-one and group sessions based on the ward and in a therapy gym. Patients will routinely receive one treatment session daily (1), Monday to Friday, with an average treatment session lasting 60 minutes (1). Once a patient is limb fitted, they will then receive a second session of 40 minutes.
- The Prosthetic service is delivered on site at Raigmore (1).
- Patients will routinely be discharged home after prosthetic fitting (2).
- Prosthetic candidates will have access to out-patient physiotherapy. Where geography allows, they will receive a weekly session at the acute hospital with a specialist physiotherapist. Where distance is an issue, they can attend non-specialist physiotherapy at their nearest community hospital.
- Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge.

MOC = 8/11

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

Raigmore Hospital – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	14	0	13	55	157	66	216	-13
2021	17	0	15	33	34	57	83	-13
2022	24	0	19	29	33	48	55	-12
2023	8	0	16	29	32	45	83	-15
2024	18	0	17	24	28	39	53	-12

CT – Compression Therapy, EWA – Early Walking Aid.



9.1.8 Ninewells Hospital, NHS Tayside

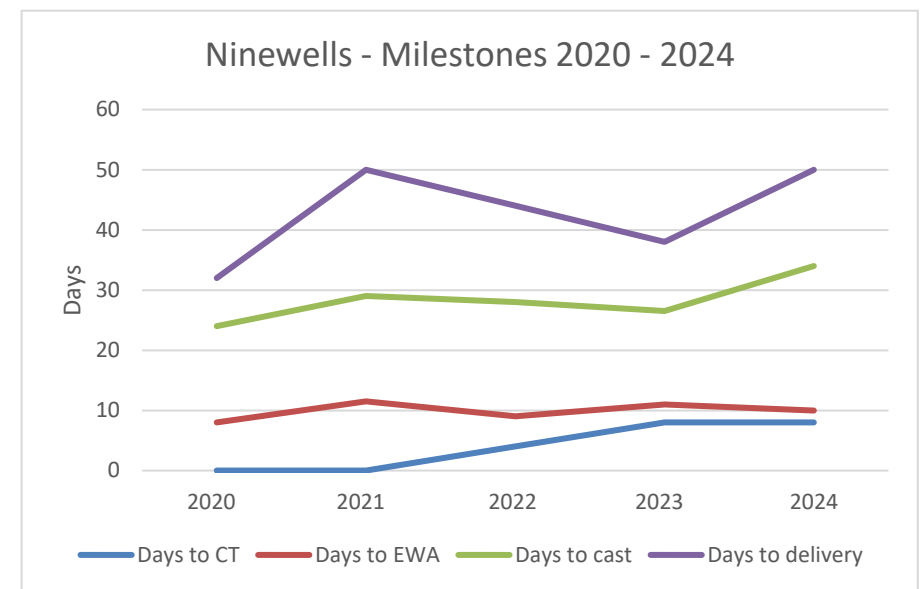
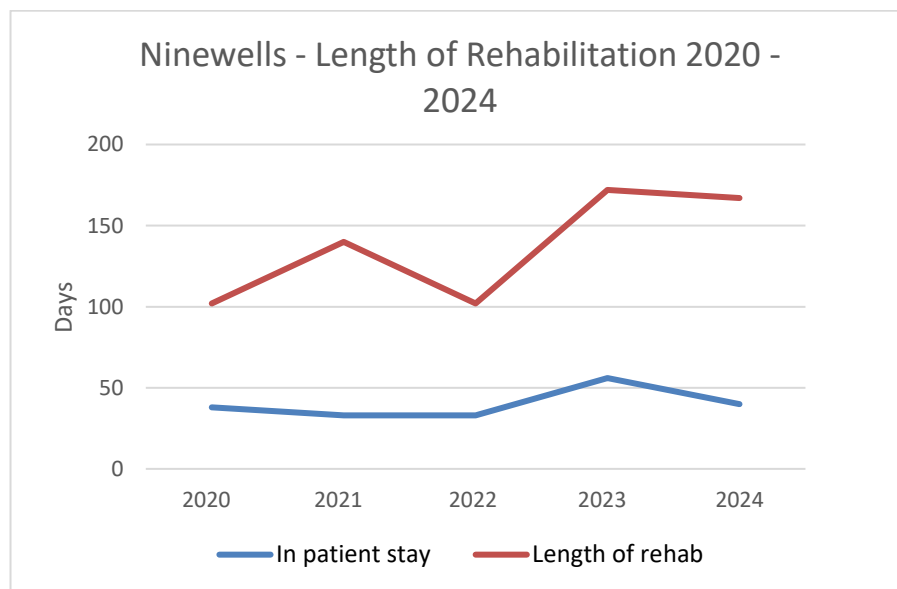
- Immediate post-operative rigid dressings are no longer routinely used.
- Following an amputation, all patients at Ninewells Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will take the form of one-to-one sessions, based mainly in the therapy gym. Patients will routinely receive one treatment session daily (2), Monday to Friday for 30-45 mins; with a second session post fitting if workload allows.
- The majority of patients are now discharged home when medically fit, prior to prosthetic fitting. The outreach service supports early discharge and provides a link between inpatient and community services. Patients are seen on average weekly until community rehabilitation teams pick up when a joint visit is coordinated to handover/teach local teams.
- The Prosthetic service is delivered on site at TORT (1).
- Specialist physiotherapy is provided for outpatients where necessary.
- Patients, who are not appropriate for prosthetic fitting, will receive daily physiotherapy gym sessions until they are at a level for discharge home, and do not routinely access physiotherapy on discharge.

MOC = 5/11

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

Ninewells Hospital – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	41	0	8	24	32	38	102	0
2021	41	0	12	29	50	33	140	-13
2022	29	4	9	28	44	33	102	-8
2023	46	8	11	27	38	56	172	-10
2024	41	8	10	34	50	40	167	-12

CT – Compression Therapy, EWA – Early Walking Aid.



9.1.9 Queen Elizabeth University Hospital (QEUH), NHS Greater Glasgow & Clyde

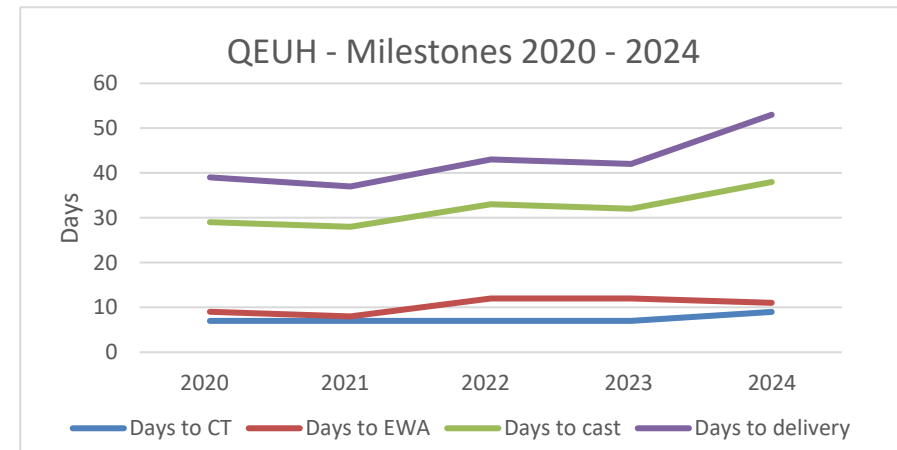
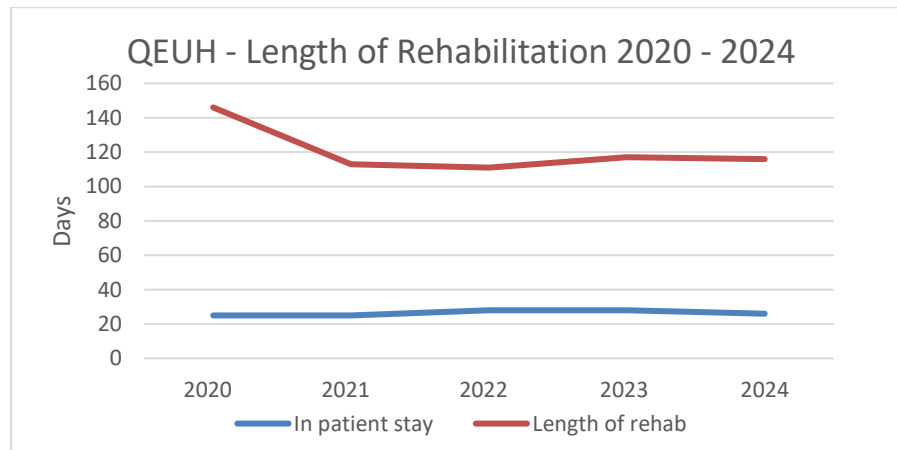
- Immediate post-operative rigid dressings are not routinely used
- Following an amputation, patients at QEUH will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will be provided in one-to-one and group sessions, based on the ward and in a therapy gym. Patients will routinely receive one treatment session daily (2), Monday to Friday, with an average treatment session lasting 60 minutes (1).
- The Prosthetic service is delivered on site at WestMARC (1).
- Patients who are appropriate for prosthetic input will be routinely discharged after casting for their prosthetic limb. However, if there are access difficulties at home some are kept in until they are mobilising with their prosthesis (1).
- Patients who are appropriate for prosthetic input will have access to out-patient physiotherapy follow-up at WestMARC, their nearest limb-fitting centre. They will see a specialist physiotherapist (1) once a week and have access to a second group session if appropriate, community outreach, clinical psychology and specialist OT services.
- Patients, who are not appropriate for prosthetic fitting, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge.

MOC = 8/11

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

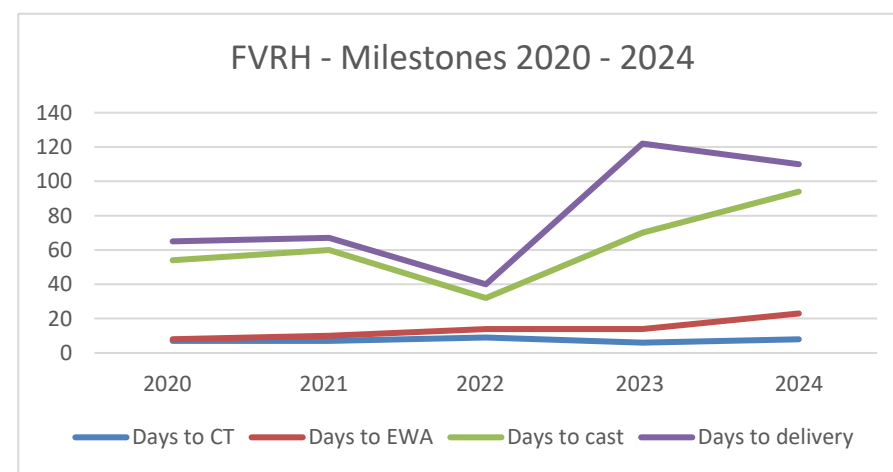
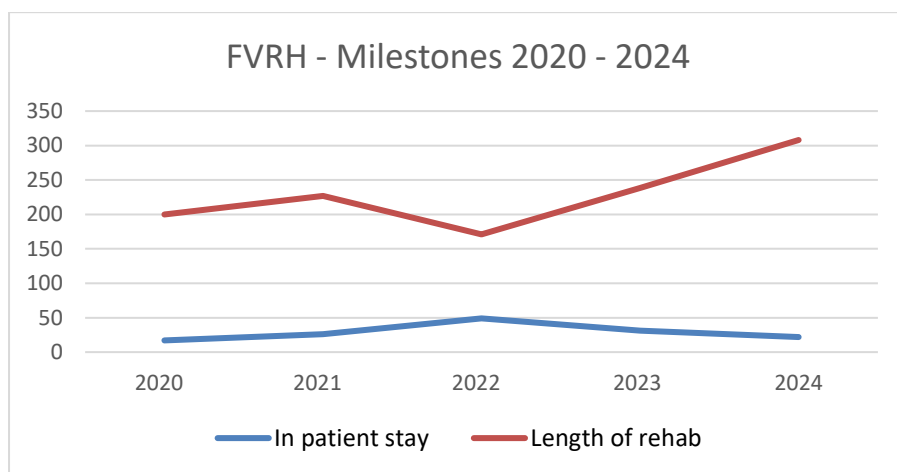
Queen Elizabeth University Hospital – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	54	7	9	29	39	25	146	-7
2021	76	7	8	28	37	25	113	-3
2022	56	7	12	33	43	28	111	-4
2023	81	7	12	32	42	28	117	-5
From 2024 onwards, the milestones are for unilateral transtibial limb fitted patients who were amputated at QEUH and had rehabilitation at WestMARC								
2024	49	9	11	38	53	26	116	-6

CT – Compression Therapy, EWA – Early Walking Aid



Please note the above data refers to the patients who remained in GG&C for their rehabilitation journey

QEUH repatriated to FVRH – Unilateral Transtibial Milestones							
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab
2020	6	7	8	54	65	17	200
2021	13	7	10	60	67	26	227
2022	5	9	14	32	40	49	171
2023	12	6	14	70	122	31	239
2024	9	8	23	94	110	22	308



Please note from February 2019, the above data refers to the patients who were repatriated from QEUH to Forth Valley to complete their rehabilitation journey. Compression therapy and use of EWA would, in the majority of cases, be initiated at QEUH.

9.1.10 University Hospital Hairmyers, NHS Lanarkshire

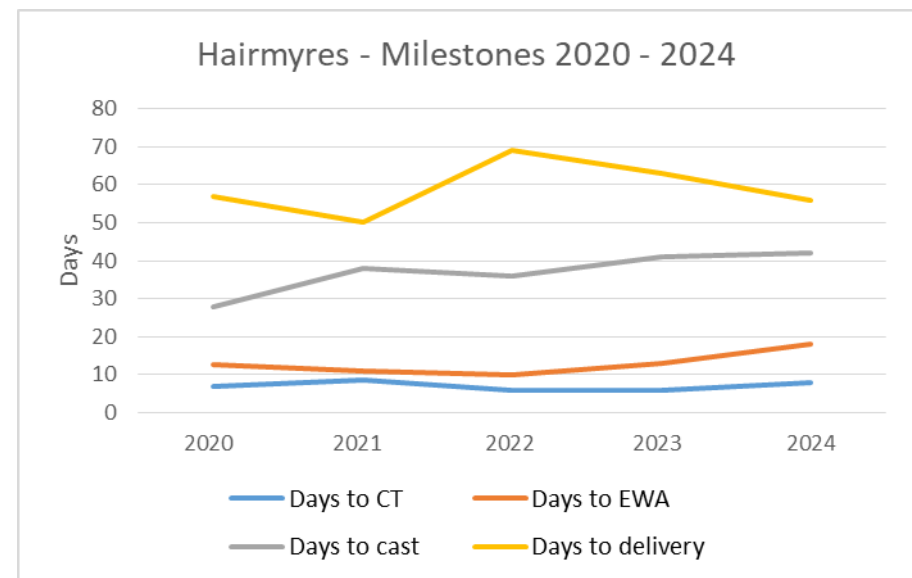
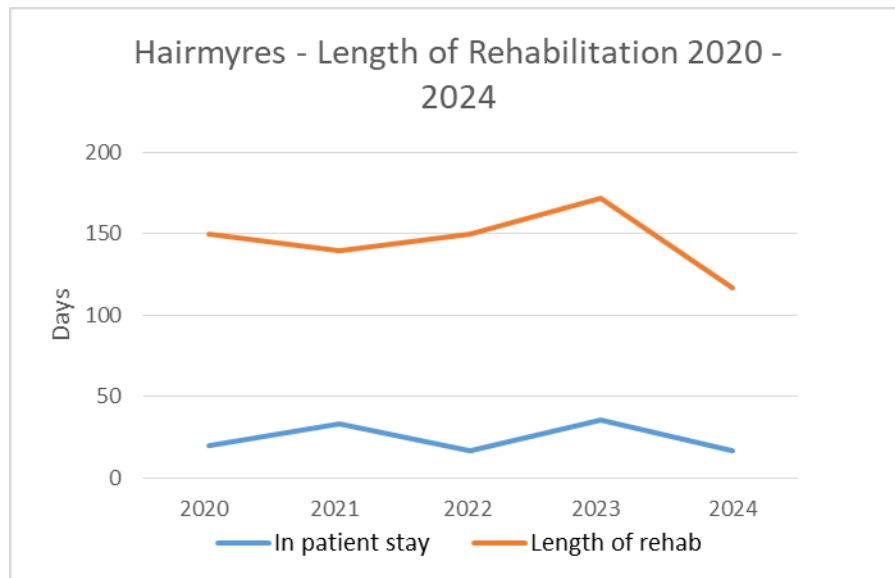
- Immediate post-operative rigid dressings are used with some patients (1)
- Following an amputation, patients at Hairmyres Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will be provided in one-to-one and group sessions, based on the ward and in a therapy gym. Patients will routinely receive one treatment session daily Monday to Friday (3 ward sessions and 2 gym sessions) (1), with an average Gym treatment session lasting 60 minutes and the ward session 45 minutes (1).
- The Prosthetic service is delivered at WESTMARC.
- Patients who are appropriate for prosthetic-fitting will routinely be discharged before primary prosthetic review.
- Patients who are appropriate for prosthetic input will have access to routine out-patient physiotherapy follow-up. They will see a specialist physiotherapist (1) once a week either in a group or a 1:1 basis depending on caseload and suitability. There are occasions where patients will attend twice weekly if it is on benefit to them and staffing allows.
- Patients, who are not appropriate for prosthetic fitting, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge. This will be provided via a domiciliary service.

MOC = 6/11

5-year milestone data following Unilateral Transtibial Amputation (2020 - 2024)

University Hospital Hairmyres – Unilateral Transtibial Milestones								
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab	LCI-5 Change
2020	19	7	13	28	57	20	150	-11
2021	21	9	11	38	50	33	140	-13
2022	29	6	10	36	69	17	150	-10
2023	48	6	13	41	63	36	172	-4
From 2024 onwards, the milestones are for unilateral transtibial limb fitted patients who were amputated and had rehabilitation at UHH								
2024	10	8	18	42	56	17	117	-3

CT – Compression Therapy, EWA – Early Walking Aid.



Please note from 2024 the above data refers to the patients who remained in UHH for their rehabilitation journey

Centralisation of services to University Hospital Hairmyres occurred in 2023. The following data refers to patients who were repatriated from University Hospital Hairmyres to Ayr, Dumfries, Monklands and Wishaw for their outpatient rehabilitation journey. Compression therapy and use of EWA would, in the majority of cases, be initiated at UHH.

UHH repatriated to Ayr – Unilateral Transtibial Milestones							
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab
2023	12	6	16	46	66	36	234
2024	12	5	10	40	56	17	172

UHH repatriated to Dumfries – Unilateral Transtibial Milestones							
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab
2023	8	7	12	50	66	50	280
2024	10	5	14	38	51	34	136

UHH repatriated to Monklands – Unilateral Transtibial Milestones							
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab
2023	7	6	129	41	69	31	288
2024	10	8	15	58	77	11	144

UHH repatriated to Wishaw – Unilateral Transtibial Milestones							
	Limb-fitted (n)	Days to CT	Days to EWA	Days to cast	Days to delivery	In patient stay	Length of rehab
2023	11	5	13	40	58	38	197
2024	8	5	11	51	67	12	138

10 Individual Hospital Summaries for 2024

10.1 Data Checking Summary

This section presents the national data broken down by amputating hospital; please refer to Section 9; further information on each service's model of care.

The number of amputees at each hospital and the data completeness are shown in Table 48, 2024.

Table 47 Data Checking Summary by Hospital, 2024

Hospital	Forms issued (n=)	Forms missing (n=)	Forms complete(n=)	Forms Incomplete (n=)
Aberdeen Royal Infirmary	76	0	76	2
University Hospital Ayr	12	0	12	0
Borders General Hospital	0	0	0	0
Dumfries & Galloway Royal Infirmary	1	0	1	0
Forth Valley Royal Hospital	0	0	0	0
Glasgow Royal Infirmary	21	1	20	0
Golden Jubilee National Hospital	4	0	4	0
University Hospital Hairmyres	173	0	173	0
University Hospital Monklands	0	0	0	0
Ninewells Hospital	134	0	134	0
Raigmore Hospital	38	0	38	0
Royal Alexandria Hospital	1	0	1	0
Royal Infirmary of Edinburgh	143	0	143	0
Queen Elizabeth University Hospital	251	0	251	0
St John's Hospital	0	0	0	0
University Hospital Wishaw	3	0	3	0
Woodend Hospital	0	0	0	0
Inverclyde	0	0	0	0
Western Isles	0	0	0	0
Outside Scottish Service	1	0	1	0
National	858	1	857	2

10.2 Key Performance Indicators by Hospital

Tables 49 to 53 only include those centres with > 10 amputation surgeries in 2024. This is to ensure data protection and validity of data analysis.

10.2.1 Age and FCI

Table 48 Median Age, and FCI, 2024

Hospital	Median Age (years)	Mean FCI
Aberdeen Royal Infirmary	69	3
University Hospital Ayr	55	3.2
Glasgow Royal Infirmary	61	1.9
University Hospital Hairmyres	68	2.8
Ninewells Hospital	67	2.8
Queen Elizabeth University Hospital	68	2.8
Raigmore Hospital	72	3.2
Royal Infirmary of Edinburgh	68	2.6
National	68	2.8

Abbreviations: FCI = Functional Co-morbidities Index (Appendix E)

10.2.2 Final Level of Amputation

The final level of Amputation at end of the rehabilitation period is recorded in Table 50, 2024.

Table 49 Final level of Amputation at end of Rehabilitation by Hospital, 2024

Hospital	Unilateral TTA n (%)	Unilateral TFA n (%)	Other n (%)	Bilateral TTA n (%)	Bilateral TFA n (%)	TTA & TFA n (%)	Other n (%)	Total n (%)
Aberdeen Royal Infirmary	21 (28%)	39 (52%)	1 (1.3%)	4 (5.3%)	9 (12%)	1 (1.3%)	0	75 (100%)
University Hospital Ayr	10 (83.3%)	2 (16.7%)	0	0	0	0	0	12 (100%)
Glasgow Royal Infirmary	6 (30%)	10 (50%)	3 (20%)	0	0	0	0	20 (100%)
University Hospital Hairmyres	75 (43.4%)	61 (35.3%)	1 (0.6%)	17 (9.8%)	16 (9.2%)	3 (1.7%)	0	173 (100%)
Ninewells Hospital	52 (38.8%)	46 (34.3%)	3 (2.2%)	18 (13.4%)	7 (5.2%)	8 (6%)	0	134 (100%)
Queen Elizabeth University Hospital	119 (47.4%)	93 (37.1%)	0	17 (6.8%)	12 (4.8%)	9 (3.6%)	1 (0.4%)	251 (100%)
Raigmore Hospital	28 (73.7)	7 (18.4%)	0	3 (7.9%)	0	0	0	38 (100%)
Royal Infirmary of Edinburgh	71 (49.7%)	49 (34.3%)	6 (4.2%)	7 (4.9%)	6 (4.2%)	4 (2.8%)	0	143 (100%)
National	384 (44.9%)	310 (36.2%)	18 (2.2%)	68 (7.9%)	50 (5.8%)	25 (2.9%)	1 (0.1%)	856 (100%)

Abbreviations: TFA=transfemoral, TTA=transtibial

10.2.3 Final Outcome

Final outcome (at discharge from physiotherapy) by hospital are shown in Table 51, 2024.

Table 50 Key Performance Indicators by Hospital, 2024

Hospital	LF n (%)	NLF n (%)	Abandoned n (%)	Died n (%)	Total n (%)
Aberdeen Royal Infirmary	27 (36%)	37 (49.3%)	2 (2.7%)	9 (12%)	75 (100%)
University Hospital Ayr	8 (66.7%)	2 (16.7%)	1 (8.3%)	1 (8.3%)	12 (100%)
Glasgow Royal Infirmary	10 (50%)	5 (25%)	0	5 (25%)	20 (100%)
University Hospital Hairmyres	66 (38.2%)	80 (46.2%)	1 (0.6%)	26 (15%)	173 (100%)
Ninewells Hospital	61 (45.5%)	58 (43.3%)	3 (2.2%)	12 (9%)	134 (100%)
Queen Elizabeth University Hospital	102 (40.6%)	105 (41.8%)	11 (4.4%)	33 (13.1%)	251 (100%)
Raigmore Hospital	22 (57.9%)	11 (28.9%)	1 (2.6%)	4 (10.5%)	38 (100%)
Royal Infirmary of Edinburgh	63 (44.1%)	67 (46.9%)	3 (2.1%)	10 (7%)	143 (100%)
National	362 (42.3%)	367 (42.9%)	22 (2.6%)	105 (12.3%)	856 (100%)

Abbreviations: LF=Limb-fitted, NLF=non-Limb-fitted

10.3 Milestones by hospital (limb-fitted unilateral transtibial amputees)

The number of, and milestones data for limb-fitted unilateral transtibial amputees are presented for each hospital in Table 52, 2024.

Table 51 Key Performance Indicators (milestones) by hospital, 2024

Hospital	Number of unilateral TTA	% Limb Fitted	Days to CT	Days to EWA	Days to Casting	Days to Delivery	In Patient Stay	Overall Length of Rehab	LCI-5 change score
Aberdeen Royal Infirmary	21	15 (71.4%)	17	26	61	82	86	112	-3
University Hospital Ayr	10	8 (80%)	9	10	59	74	53	172.5	-1.5
Glasgow Royal Infirmary	6	4 (66.7%)	6	32	47	61	31	115	-2
University Hospital Hairmyres	75	50 (66.7%)	6	12	41.5	56	17	144	-4
Ninewells Hospital	52	41 (78.8%)	8	10	34	50	40	167	-11.5
Queen Elizabeth University Hospital	119	70 (58.8%)	8	11.5	40	57	29	127	-4.5
Raigmore Hospital	28	18 (64.3%)	0	17	24	28	39	53	-12
Royal Infirmary of Edinburgh	71	46 (64.8%)	10	20	58	76	46	122	-11
National Median	384	254 (66.1%)	8	13	41	58.5	36	133	-7

Abbreviations: Transtibial Amputation (TTA), Compression therapy (CT), Early Walking Aid (EWA).

Definitions:

Days to CT	Median days from final surgery to start of compression therapy.
Days to EWA	Median days from final surgery to start of early walking aid therapy e.g., PPAM aid.
Days to casting	Median days from final surgery to casting for prosthesis.
Days casting to delivery	Median days from final surgery to delivery of prosthesis

11 References

- 1 Hebenton J, Scott H, Davie-Smith F, Seenan C. Relationship between models of care and key rehabilitation milestones following unilateral transtibial amputation: a national cross-sectional study. *Physiother (United Kingdom)* 2019;**105**(4):476–82.
- 2 Scott H, Patel R. Benchmarking Primary Lower Limb Amputee Services for Years 2004, 2005 and 2006.' ScotRET Prosthetics Service Group. 2009.
- 3 Condie E, Scott H, Treweek S. Lower Limb Prosthetic Outcome Measures: A Review of the Literature 1995 to 2005. *JPO J Prosthetics Orthot* 2006;**18**(Proceedings):P13–45. Doi: 10.1097/00008526-200601001-00004.
- 4 Franchignoni F, Giordano A, Ferriero G, Muñoz S, Orlandini D, Amoresano A. Rasch analysis of the locomotor capabilities index-5 in people with lower limb amputation. *Prosthet Orthot Int* 2007;**31**(4):394–404. Doi: 10.1080/03093640701253952.
- 5 Franchignoni F, Orlandini D, Ferriero G, Moscato TA. Reliability, validity, and responsiveness of the locomotor capabilities index in adults with lower-limb amputation undergoing prosthetic training. *Arch Phys Med Rehabil* 2004;**85**(5):743–8. Doi: 10.1016/j.apmr.2003.06.010.
- 6 Davie-Smith F, Hebenton J, Scott H. <https://bacpar.csp.org.uk/publications/sparg-report-2016>. SPARG. <https://bacpar.csp.org.uk/publications/sparg-report-2016%0A>. 08/20/2019.

12 Appendices

12.1 Appendix A

Bibliography & Research

Ross M, Ramsay C, Geddes S and Davie-Smith F (2022) 'Exercise Intervention for the Treatment of Patients with Intermittent Claudication' Scottish Physiotherapy Amputee Research Group, Glasgow.

(www.bacpar.org/data/Resource_Downloads/IntermittentClaudicationguideline2022.pdf)

Lee, J., Davie-Smith, F., Hebenton, J., Sharp, K. and Seenan, C., 2022. Impact of PPAM aid use on the time to prosthetic limb delivery in patients with unilateral transtibial amputation: a retrospective analysis. *Prosthetics and Orthotics International*, pp.10-1097.

Crane, H., Boam, G., Carradice, D., Vanicek, N., Twiddy, M. and Smith, G.E., 2021. Through-knee versus above-knee amputation for vascular and non-vascular major lower limb amputations. *Cochrane Database of Systematic Reviews*, (12).

Hebenton, J., Scott, H., Seenan, C. and Davie-Smith, F., 2019. Relationship between models of care and key rehabilitation milestones following unilateral transtibial amputation: a national cross-sectional study. *Physiotherapy*, 105(4), pp.476-482.

Davie-Smith, F., Paul, L., Stuart, W., Kennon, B., Young, R. and Wyke, S., 2019. The influence of socio-economic deprivation on mobility, participation, and quality of life following major lower extremity amputation in the West of Scotland. *European Journal of Vascular and Endovascular Surgery*, 57(4), pp.554-560.

Davie-Smith, F., Coulter, E., Kennon, B., Wyke, S. and Paul, L., 2017. Factors influencing quality of life following lower limb amputation for peripheral arterial occlusive disease: A systematic review of the literature. *Prosthetics and Orthotics International*, 41(6), pp.537-547.

Davie-Smith, F., Paul, L., Nicholls, N., Stuart, W.P. and Kennon, B., 2017. The impact of gender, level of amputation and diabetes on prosthetic fit rates following major lower extremity amputation. *Prosthetics and orthotics international*, 41(1), pp.19-25.

Hebenton, J., Colvin, J., Seenan, C. and Scott, H., 2016. Early PPAM aid use post-unilateral transtibial amputation is associated with reduced time to prosthetic fitting and finishing rehabilitation. *Physiotherapy*, 102, pp.e147-e148.

12.2 Appendix B

Aetiology Mapping

Definition

If there are several factors contributing to the patient's need for an amputation, the main or root cause of the amputation will be selected here, other factors are included as co-morbidities using FCI.

- PAD – Peripheral Arterial Disease this terminology replaces the previously used "Peripheral Vascular Disease".
- Diabetes. If patient is diabetic enter as aetiology unless tumour, trauma, burns, drug abuse or orthopaedic is the cause. The amputation may be the result of PAD and/or neuropathy and/or renal failure.
- Blood borne infection includes meningitis
- Renal Failure – only where diabetes is not present
- Other for any aetiology not listed.

Since 2016 '**immediate cause of amputation**' has been included. This is either infection, ischaemia or a combination of both and will be secondary to aetiology. This section may not be applicable when amputation is due to trauma, tumour or congenital deformity in which case mark as not applicable.

Mapping

The list of aetiologies used in this report was revised and reduced in 2004 and revised again in 2016 in order to improve accuracy of recording and relevance of categories. The following shows the mapping of the previous list of aetiologies to the current list.

Previous category	New category 2004	2016
PAD – Arteriosclerosis	Unchanged	Unchanged
PAD – Diabetes	Diabetes	Unchanged
Trauma	Trauma or Burns	Unchanged
Burns		
Tumour	Unchanged	Unchanged
Congenital deformity	Unchanged	Unchanged
Drug abuse	Unchanged	Unchanged
Venous Problems	Venous disease	Unchanged
Non-union of fracture	Orthopaedic	Non-union of fracture
Failed joint replacement		Failed joint replacement
Acquired deformity		Acquired deformity
Septicaemia	Blood-borne infection	Unchanged
Renal Problems	Renal Failure	Unchanged
Other	Other	Chronic regional pain Syndrome
Local Infection		Acute vascular incident
Not recorded	Unchanged	Not recorded

12.3 Appendix C *Locomotor Capabilities Index 5*

Only fill this in for amputees who are using their prosthesis to WALK.

Please note: this assessment must be completed ***with the amputee present or on the telephone*** and the amputee ***must be asked*** how they think they can manage each activity. It is how the patient perceives their own performance that is being measured.

Put 0,1,2,3 or 4 in the appropriate boxes where: -

- 0. = No
- 1. = Yes, if someone helps
- 2. = Yes, if someone is near
- 3. = Yes, alone with walking aid(s)
- 4. = Yes, alone **without** walking aid

Activity	6 months pre-admission	Final Discharge
<i>Basic Activities</i>		
Get up from a chair		
Walk indoors		
Walk outside on even ground		
Go up the stairs with a hand-rail		
Go down the stairs with a hand-rail		
Step up a kerb		
Step down a kerb		
TOTAL		
<i>Advanced activities</i>		
Pick up an object from the floor when standing		
Get up from the floor (e.g. after a fall)		
Walk outside on uneven ground (e.g. grass, gravel, slope)		
Walk outside in bad weather (e.g. rain, wind, snow)		
Go up a few steps without a hand-rail		
Walk down without a hand-rail		
Walk while carrying an object		
TOTAL		
OVERALL TOTAL		
CHANGE of overall total from 6 months preadmission to final discharge		

12.4 Appendix D Functional Co-morbidities Index

Lower limb amputees are a predominantly elderly group with a relatively high incidence of co-morbid disease. This has not been previously accounted for in the SPARG data collection and analysis. The Functional Co-morbidities Index (FCI) was incorporated into the data set from 2008.

The FCI was developed and validated with physical function as the outcome (Groll et al 2005). The more commonly used indices predict mortality or administrative outcomes such as hospital length of stay. These indices tend to include conditions that are asymptomatic and impact on life expectancy but not physical function (for example, hypertension) and have been found not to correlate strongly with physical disability.

The FCI was developed using 2 different samples of adults: 1 group n= 9,423 'random Canadian adults'; 2nd group n = 28,349 'US adults seeking treatment for spinal ailments' using the physical subscale of the SF36 as the outcome.

The FCI is completed by scoring a 1 if a disease is present and 0 if it is not. A score of 0 indicates no co-morbid illness and a score of 18 indicates the highest number of co-morbid illnesses. The disease is only scored as present if it is diagnosed and documented in medical notes.

The BMI is calculated for each patient by dividing the patient's weight by their height in metres squared (weight / height ²). If neither height nor weight cannot be measured or obtained, BMI can be estimated using the mid upper arm circumference (MUAC) ('Must' Explanatory Booklet). If MUAC is more than 32.0cm, BMI is likely to be more than 30kg/m² i.e. patient is likely to be obese.

Functional Co-morbidities Index

Arthritis (rheumatoid and osteoarthritis)	Yes	☐	No	☐
Osteoporosis	Yes	☐	No	☐
Asthma	Yes	☐	No	☐
Chronic Obstructive Pulmonary Disease, Acquired Respiratory Distress Syndrome, Emphysema	Yes	☐	No	☐
Angina	Yes	☐	No	☐
Congestive Heart Failure (or heart disease)	Yes	☐	No	☐
Heart Attack (myocardial infarction)	Yes	☐	No	☐
Neurological disease e.g. Multiple Sclerosis or Parkinson's	Yes	☐	No	☐
CVA or TIA	Yes	☐	No	☐
Peripheral Arterial Disease	Yes	☐	No	☐
Diabetes Type I and II	Yes	☐	No	☐
Upper gastrointestinal disease (ulcer, hernia, reflux)	Yes	☐	No	☐
Depression	Yes	☐	No	☐
Anxiety or panic disorders	Yes	☐	No	☐
Visual impairment (cataracts, glaucoma, macular degeneration)	Yes	☐	No	☐
Hearing impairment (very hard of hearing even with hearing aids)	Yes	☐	No	☐
Degenerative disc disease including, back disease, spinal stenosis or severe chronic back pain	Yes	☐	No	☐
Obesity and/or BMI > 30 (Pre-op weight in Kg/height in metres ²)	Yes	☐	No	☐
Weight (Kg)	Yes	☐	No	☐
Height (metres)				
BMI =				
Please see Guidance Notes	Score (Yes = 1, No = 0)	/ 18		

12.5 Appendix E Timed Up and Go Test (TUG)

Section 2.5 of the SPARG form has contained a Timed up and Go Test (TUG) for many years. Due to such variety in pathways of care across Scotland it has been difficult for every service to capture this data, it was therefore not collected in the national database.

Since moving to the excel spreadsheet in 2023 it has allowed us to look at this data for the first time and the results of this are detailed below. Due to low numbers please consider this an example only, we hope that through reporting this data there will be encouraged uptake nationally.

The TUG test is to be carried out at the time the patient first walks independently with a prosthesis and a walking aid out with the parallel bars (therapist walks with patient and if they have to intervene the test is void until the patient can do it without intervention) and then at final discharge (at the same point in time that the final LCI5 is done).

The first TUG typically indicates that the patient is taking the prosthesis home for the first time, therefore it is an important milestone in the patient's prosthetic rehabilitation journey.

	Median Change (seconds)		Median time pre		Median time post		IPDD to 1 st TUG (median)		Walking aid pre		Walking aid post	
	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
Transtibial (2023 n=89) (2024 n=85)	-17.5	-20	38	43	15	18	40 days	45.5 days	2	1	5	5
Transfemoral (2023 n=16) (2024 n=22)	-8	-25	59	76.5	39.5	50	78 days	67.5 days	2	2	2	2
Bilateral Transtibial (2023 n=10) (2024 n=7)	-10	-17	38	49	38	24.5	70 days	59 days	2	2	2	3

Walking aid key:

- 1 – Walking frame (any)
- 2 – Crutches (any) x 2
- 3 – Crutch (any) x 1
- 4 – Walking Sticks x 2
- 5 – Walking Sticks x 1
- 6 – None

For further information please contact:

Joanne Hebenton, SPARG Chair - Joanne.hebenton@nhs.scot