

A Survey of the Lower Limb Amputee Population in Scotland 2017 Public Report



SPARG
Scottish Physiotherapy Amputee
Research Group

June 2020

Authors

Dr F Davie-Smith, SPARG Research Officer
Ms J Hebenton, SPARG Executive Committee Chair
Ms H Scott, SPARG Chairman



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.....	7
2	SPARG 2017 Annual Report: Executive Summary	8
3	Introduction	10
4	Results: Demographic Profiles	11
4.1	Introduction	11
4.2	Amputee Details	11
4.2.1	Age and Sex Distribution.....	11
4.2.2	Immediate cause of amputation	12
4.2.3	Diabetic Amputees	13
4.2.4	Aetiology of Amputation	14
4.2.5	Initial Level of Amputation	15
4.2.6	Patients Fitted with a Prosthesis	16
4.2.7	Prosthetic Rehabilitation Abandoned	17
4.2.8	Mortality	17
4.2.9	Final Outcome Summary.....	18
4.2.10	Unilateral and Bilateral Amputees.....	19
4.2.11	Bilateral Amputations	20
4.2.12	Bilateral Amputations in Same Episode of Care	20
4.2.13	Falls	21
4.2.14	Revisions and Re-amputations	22
4.2.1	Functional Co-morbidities Index.....	23
5	Physiotherapy and Rehabilitation.....	24
5.1	Compression Therapy.....	24
5.2	Early Walking Aids	24
5.3	Mobility Outcomes: Locomotor Capabilities Index 5(LCI-5).....	25
6	Milestone Data	26
6.1	Statistics Presented	26
6.2	Days to Casting	27
6.3	Casting to Delivery	28
6.4	Days to Inpatient Discharge: Fitted with a Prosthesis.....	29
6.5	Days to Inpatient Discharge: Not Fitted with a Prosthesis	29
6.6	Days from inpatient to outpatient discharge: Fitted with a prosthesis.....	30
7	Trends in Compression Therapy and Early Walking Aids (EWAs)	31
7.1	Statistics Presented	31
7.2	Trends in Compression Therapy.....	31
7.3	Trends in Early Walking Aids	32
8	Individual Hospital Summaries for 2017.....	33
8.1	Data Checking Summary.....	33
8.2	Key Performance Indicators by Hospital	34
8.2.1	Age and FCI	35
8.2.2	Final Level of Amputation.....	36
8.2.3	Final Outcome	37
8.3	Milestones by hospital (limb-fitted unilateral transtibial amputees).....	38

9	Limb -fitting Centres	40
9.1	Hospital to Limb fitting centre	40
9.2	Milestones by Limb-fitting centre.....	41
10	References.....	42
11	Appendices.....	43
11.1.1	Appendix A Project work	43
11.1.2	Appendix B List of SPARG Database reporting facilities	44
11.1.3	Appendix C Aetiology Mapping	45
11.1.4	Appendix D Locomotor Capabilities Index 5	46
11.1.5	Appendix E Functional Co-morbidities Index	47
11.1.6	Appendix F Data Cleaning Steps	48
11.1.7	Appendix G Models of Care Summary for 2017	49
11.1.8	Appendix H Multidisciplinary Advisory Group	57
11.1.9	Appendix I Portsmouth Report 2017 Data	58

Tables and Figures

Table 1	Factors influencing rehabilitation milestones and outcomes	8
Table 2	Rehabilitation milestones and outcomes for unilateral TTA	8
Table 3	Age and sex of amputee population, 2008- 2017.....	11
Table 4	Cause of amputation recorded by level and by aetiology.....	12
Table 5	Cause of amputation 2016 – 2017	12
Table 6	Diabetic amputees, age and sex, 2016 & 2017	13
Table 7	Aetiology of amputation, 2012 – 2017.....	14
Table 8	Amputation Level, 2012-2017	15
Table 9	Patients fitted with a prosthesis, all 2008 – 2017	16
Table 10	Proportion of patients with unilateral amputation fitted with a prosthesis by level (2008 – 2017)	16
Table 11	Proportion of patients with bilateral amputation fitted with a prosthesis, bilateral (2008 – 2017).....	16
Table 12	Bilateral patients fitted with a prosthesis by level 2017	16
Table 13	Sex and limb fitting outcome, 2016– 2017	16
Table 14	Prosthetic rehabilitation abandoned as a proportion of those initially fitted, 2012– 2017	17
Table 15	Mortality 2011 - 2017	17
Table 16	Final outcome summary, 2014 - 2017.....	18
Table 17	Final outcome by aetiology	18
Table 18	Unilateral and bilateral amputees, 2012 – 2017.....	19
Table 19	Bilateral amputees, 2012- 2017	19
Table 20	Demographic profile and final outcome summary of patients with bilateral amputations at end of rehabilitation period.....	20
Table 21	Bilateral amputations, 2008-2017	20
Table 22	Reported falls in hospital for all amputees and also for unilateral and bilateral amputees (all levels).....	21

Table 23	Recorded falls at home for all amputees who had outpatient physiotherapy.....	21
Table 24	Recorded falls for all amputees in hospital 2016 – 2017.....	21
Table 25	Revisions and re-amputations, 2012-2017	22
Table 26	Transtibial to transfemoral re-amputations, 2012-2017.....	22
Table 27	Functional Co-Morbidities by Level and Aetiology	23
Table 28	Functional Co-morbidities Mean Score, 2012 – 2017	23
Table 29	Type of compression therapy used, 2012-2017	24
Table 30	Type of EWA used, 2012-2017	24
Table 31	Locomotor Capabilities Index by level, 2013 to 2017	25
Table 32	Days to casting milestone, descriptive statistics, 2017	27
Table 33	Casting to delivery milestone, descriptive statistics, 2017	28
Table 34	Median casting to delivery milestone, 2003-2017	28
Table 35	Days to inpatient discharge, patients fitted with a prosthesis, descriptive statistics	29
Table 36	Median days to inpatient discharge, patients fitted with a prosthesis, 2003-2017 (Unilateral Only)	29
Table 37	Days to inpatient discharge, patients not fitted with a prosthesis, descriptive statistics, 2017	29
Table 38	Median days to inpatient discharge, patients not fitted with a prosthesis, 2003-2017 (Unilateral Only).....	29
Table 39	Days from inpatient discharge to outpatient discharge, limb-fitted amputees, 2017	30
Table 40	Median Days from inpatient discharge to outpatient discharge, limb-fitted amputees 2012 - 2017	30
Table 41	Patients receiving compression therapy within 10 days of amputation (%), 2002– 2017.....	31
Table 42	Patients using EWAs within 10 days of amputation (%), 2002– 2017	32
Table 43	Data Checking Summary by Hospital	33
Table 44	Model of care (MOC) indicators	34
Table 45	Total model of care score for centres $n \geq 10$ (see Appendix H for more detail)	34
Table 46	Median Age, and FCI	35
Table 47	Final level of Amputation at end of Rehabilitation by Hospital	36
Table 48	Key Performance Indicators by Hospital	37
Table 49	Key Performance Indicators (milestones) by hospital, 2017	38
Table 50	Limb-fitting centres, referring hospitals and % limb-fitted.....	40
Table 51	Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre	41

Figure 1	Rehabilitation Milestones	26
Figure 2	Groups in milestones	26
Figure 3	Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2002-2017	27
Figure 4	Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2002– 2017	31
Figure 5	Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2002- 2017.....	32
Figure 6	Days from surgery to commencing compression therapy (CT) and early walking aid (EWA) use in unilateral TTAs by hospital	39
Figure 7	Days from surgery to cast and delivery of a prosthetic limb in unilateral TTA's by hospital	39
Figure 8	Days from surgery to inpatient and final discharge from physiotherapy in unilateral TTAs by hospital.....	39

1 Acknowledgements

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

The final draft of this report was reviewed by a national multidisciplinary group (see Appendix I) and we would like to thank each of them for taking the time to do this.

2 SPARG 2017 Annual Report: Executive Summary

National data: key points

- People are undergoing lower limb amputation earlier in life. Since SPARG began reporting in 1999 the median age has decreased from 71 to 66.
- More than half of all patients in 2017 have an amputation associated with diabetes.
- The median age of new amputees with diabetes is now 7 years less than those with peripheral arterial disease (PAD) without diabetes.
- The use of rigid post-operative dressings (POP) for below knee amputees, which has been shown to improve outcomes, is the lowest it has been since 2012 (14.8%).
- People with bilateral below knee amputations report significantly better mobility outcomes than unilateral above knee amputees.

Individual Hospital data

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 1). Heberton 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 1 Factors influencing rehabilitation milestones and outcomes

Influencing factors	AH	DGRI	FVRH	GRI	HH	QEUH	NH	RH	RIE/AA	VH	National median
Total moc score (max score = 11)	7	6	6	2	6	8	10	9	7	11	6.9
Median age	69	68	64	52	66	63	68.5	73	66	62	66
Median FCI (max score = 18)	3.6	2.5	3.6	1	3.1	3.2	2.9	2.9	2.9	2.8	3.1

Table 2 Rehabilitation milestones and outcomes for unilateral TTA

Milestones and outcomes for unilateral TTA	AH N=19	DGRI N=4	FVRH N=10	GRI^ N=5	HH N=29	QEUH N=43	NH*° N=20	RH*° N=11	RIE/AA° N=18	VH*° N=11	National median
Days to LF	72	51.5	53	38	74	37	43.5	36	63	44	51
%LF	64	50	48	100	81	68	79	69	46	92	66
LCI5 change score	-8	4.5	-11.5	9	-9	0	-9	-13	-11	0	-8

KEY: -

Red = less positive compared to national median, AMBER = similar to national median, GREEN = more positive compared to national median.

FCI = Functional Co-morbidities Index. MOC = model of care,

MOC indicators: Immediate post-operative rigid dressing, Specialist physiotherapy in first 14 days, Daily inpatient gym session, Inpatient gym session ≥ 1 hour, Prosthetic centre on site as inpatient, Prosthetic provision as an inpatient, Specialist physiotherapy outpatient service. LF = limb fitting i.e. being fitted with a prosthesis and starting walking training,

LCI5 = Locomotor Capabilities Index 5 change score, difference between score 6 months before amputation and at the end of rehabilitation. * = rigid dressing used, ° = limb fitted as inpatient, ^ note GRI has no vascular surgery.

Benchmarking points from analysis of unilateral TTA milestones and outcomes: -

Delayed use of compression therapy and walking with an early walking aid is linked to delays in fitting with a prosthetic limb (10.5 weeks vs 5 weeks) e.g. slower services AA/ERI and AH.

Discharge from hospital prior to casting for prosthetic limb in centres with older patients with more co-morbidities delays prosthetic fitting e.g. slower services AH, HH

All 3 centres who regularly use a rigid immediate postoperative dressing POP (faster services NH, RH and VH) are limb fitted significantly more quickly than national median.

Timeous application of compression therapy and EWAs by specialist physiotherapists on a daily basis, casting before hospital discharge followed by routine, specialist outpatient rehabilitation at the Limb Fitting Centre is linked with earlier fitting with a prosthetic limb and a good mobility outcome even with a cohort of older patients with vascular disease who are not fitted with POP e.g. QEUH.

Intensive inpatient prosthetic rehabilitation can achieve the fastest rehabilitation times as long as physiotherapy is led by onsite specialists beginning from day 1 post surgery on a daily basis e.g. faster services NH, RH and VH.

Recommendations: -

Older patients with PAD +/- diabetes should be fitted with a POP, have daily, specialist physiotherapy beginning compression therapy and walking with an early walking aid promptly as recommended in current guidelines² and be cast for their prosthesis prior to discharge from hospital. Intensive inpatient prosthetic rehabilitation can achieve the fastest rehabilitation times as long as physiotherapy is led by onsite specialists from day 1 post-surgery and carried out on a daily basis. Patients should then have specialist outpatient physiotherapy with access to full multidisciplinary team. Proximity to the limb fitting centre is a benefit both as an inpatient and outpatient.

The health economics of replacing POP technique with removable rigid dressings warrants investigation given the decline in POP use nationally.

The impact of the type and length of ongoing rehabilitation following discharge from hospital should be considered by all boards.

The full report can be accessed from the SPARG website (SPARG website:

<http://www.knowledge.scot.nhs.uk/sparg.asp>

3 Introduction

This is the 25th Annual Report on data collated from all major lower limb amputations in Scotland by the Scottish Physiotherapy Amputee Research Group (SPARG). All major amputations carried out in 2017 are included, that is, 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.

All data are entered locally onto the SPARG web-based Database. The Database has reporting facilities which allow for local data checking and analysis.

National and individual hospital data are presented in this report. All outcomes are reported according to final level of amputation. 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) models of care (MOC) has been described according to criteria identified in the benchmarking report and agreed following consultation with SPARG members. Each model of care has been scored according to a system described in a recent study into the impact MOC may have on rehabilitation milestones and outcomes after amputation ¹.

For the second year running Portsmouth Enablement Centre has collected SPARG data as part of a joint project with British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR). This data is not included with the Scottish data but is reported within the Limb fitting Centre data and in Appendix J.

Unfortunately, due to data governance restrictions for a third year, there are no data for those patients who underwent an amputation in the Grampian region, though the final number of amputees does include them. In addition to Grampian's data there were another 4 missing forms.

The quality management "data checking" system introduced in 2003 continues to be highly successful. The percentage of returned records which are complete in every respect is 97.8%.

Factors not currently accounted for in data analysis: -

- Pre-amputation vascular reconstructive surgery
- Incidence of palliative amputations, that is, life-improving surgery for patients who were previously and, in the long-term, immobile with no prospect of rehabilitation
- Social deprivation
- Final outcome at a defined point in time after surgery and longer term follow up

4 Results: Demographic Profiles

4.1 Introduction

National survey data are presented in this section. Where possible, comparisons are shown for 2008-2017. The total number of amputees for 2017 was 798; data is available for 714 of these amputees therefore included in the analysis. Missing data includes all data sets from Grampian Health Board (n= 90) and those forms not returned for data input (n=4). These 714 patients underwent 752 amputation procedures; some patients having had a re-amputation (to a higher level), or bilateral amputations during the same episode of care.

4.2 Amputee Details

4.2.1 Age and Sex Distribution

The 2017 survey contains data from 714 amputees. The data for numbers of amputees from 2008-2017 by age and gender is shown in Table1. In 2017, the median age was 66 years at time of amputation and the population were 70% male and 30% female.

Table 3 Age and sex of amputee population, 2008- 2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No. of Amputees	741	746	740	700	708	809	819	803	780	798
No. of Amputee with Data	702	729	731	688	702	803	812	704	685	714
Age Lower Quartile	61	61	61	60	61	58	57	58	56	56
Age Upper Quartile	79	77	78	77	78	78	76	76	76	76
Age Median	70	70	70	70	70	69	67	68	67	66
Males %	62.1	64.5	67	65.9	66.4	66.5	71.9	66.5	69.5	70
Females %	37.9	35.5	33	34.1	33.6	33.5	28.2	33.5	30.5	30

4.2.2 Immediate cause of amputation

The immediate cause of amputation by level and by aetiology for 2017 is shown in table 4 and table 5 compares 2016 and 2017.

Analysis of 'immediate cause' has revealed ischaemia to be the cause of amputation in 55% of all amputations, infection in 21% and a combination of infection and ischaemia in 20% (immediate cause was not applicable for 4% of all amputations). Further analysis showed that the immediate cause of amputation was ischaemia in 82% of those with aetiology of peripheral arterial disease without diabetes (PAD) and in 48% of those with diabetes.

Table 4 Cause of amputation recorded by level and by aetiology

Cause of amputation 2017		Ischaemia	Infection	Combination *	N/A**
		409 (55%)	154 (21%)	151 (20%)	32 (4%)
Level n= 746 (6 missing)	TT	217	95	93	15
	TF	187	51	57	15
	TP	0	0	0	0
	HD	0	5	1	2
	KD	5	3	0	0
	AD	0	0	0	0
Aetiology n= 637 (5 missing)	PAD without diabetes	208 (79.7%)	18 (6.9%)	35 (13.4%)	0
	Diabetes	173 (46%)	92 (24.5%)	110 (29.2%)	1(0.3%)

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

Table 5 Cause of amputation 2016 – 2017

Cause of amputation	Ischaemia	Infection	Combination*	N/A**
2016	58%	19%	18%	5%
2017	55%	21%	20%	4%

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

4.2.3 Diabetic Amputees

The following table summarises the age and sex of amputees with aetiology of diabetes and PAD without diabetes.

More than half of all amputees had the aetiology of diabetes recorded (50.3%) and these people were younger than those with PAD without diabetes (median 7 years).

Table 6 **Diabetic amputees, age and sex, 2016 & 2017**

	2016		2017	
	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes
Number of Amputees	340	253	364	245
Number with age available	340	253	364	245
Age Lower Quartile	59	62	54	62
Age Upper Quartile	76	80	74	78
Age Median	67	71	65	72
N Male	253	165	264	163
N Female	87	88	100	82
Males %	74.4	62.5	72.5	66.5
Females %	25.6	34.8	27.5	33.5

4.2.4 Aetiology of Amputation

The incidence of each aetiology recorded is shown in Table 7. Peripheral arterial disease (without diabetes) and diabetes accounted for 85.4% of all amputations in 2017.

Table 7 Aetiology of amputation, 2012 – 2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
PAD without diabetes	293	41.7	332	41.3	319	39.3	286	40.6	267	37.1	264	35.1
Diabetes	295	42	351	43.7	378	46.5	315	44.7	358	49.8	378	50.3
Trauma or Burns	19	2.7	13	1.6	17	2.1	14	2	9	1.3	21	2.8
Tumour	10	1.4	13	1.6	16	2	8	1.1	9	1.3	9	1.2
Congenital deformity	3	0.4	2	0.3	5	0.6	5	0.7	2	0.3	3	0.4
Drug abuse	12	1.7	13	1.6	14	1.7	17	2.4	15	2.1	12	1.6
Venous disease	14	2	10	1.3	0	0	5	0.7	15	2.1	16	2.1
Orthopaedic	26	3.7	39	4.9	45	5.6	24	3.4	13	1.8	15	2.0
Orthopaedic – non union									8	1.1	12	1.6
Orthopaedic failed joint									4	0.6	1	0.1
Orthopaedic acquired deformity									1	0.1	2	0.3
Blood-borne infection	6	0.9	8	1	7	0.9	8	1.1	18	2.5	18	2.4
Renal Failure	7	1	4	0.5	1	0.1	2	0.3	4	0.6	1	0.1
CRPS*									5	0.7	9	1.2
Acute Vascular Injury **	14	2	17	2.1	10	1.2	13	1.9	4	0.6	6	0.8
Not recorded	3	0.43	1	0.12	0	0.00	7	0.99	1	0.1	0	0
Total	702	100	803	100	812	100	704	100	720	100	752	100

*CRPS= Chronic Regional Pain Syndrome (previously this would have been in either "orthopaedic" or "other" category)

** Acute vascular injury (AVI): "Other" prior to 2016

4.2.5 Initial Level of Amputation

Table 8 shows the incidence of six levels of amputation for the years 2012-2017. For amputees who had bilateral amputations in the reported period, both amputations are included in the data. The number of levels recorded will therefore be greater than the number of amputees for any given year. The level indicates the initial level of the amputation.

Table 8 Amputation Level, 2012-2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Transtibial	399	53.5	477	56.3	432	51.1	377	51.2	401	56	423	56.3
Transfemoral	322	43.2	340	40.1	395	46.7	342	46.4	304	42	313	41.6
Transpelvic	3	0.4	1	0.1	0	0	1	0.1	1	0.1	0	0
Hip Disarticulation	8	1.1	11	1.3	6	0.7	5	0.7	6	0.8	8	1.1
Knee Disarticulation	13	1.7	17	2.0	13	1.5	12	1.6	7	1.0	8	1.1
Ankle Disarticulation	0	0	2	0.2	0	0	0	0	1	0.1	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0
Not recorded	1	0.1	0	0	0	0	0	0	0	0	0	0
Total	746	100	848	100	846	100	737	100	720	100	752	100

4.2.6 Patients Fitted with a Prosthesis

The number of patients fitted with a prosthesis at final discharge is shown in Table 9. Unilateral patients limb-fitted are shown in Table 10, and bilateral patients are shown in Table 11. Table 11 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. Those patients who have abandoned limb-fitting are not included in this "limb-fitted" patient group.

The proportion of patients (all levels) fitted with a prosthesis in 2017 is 43.8%. When examined by level, 66.4% of TTA and 26.4% of transfemoral (TFA) were fitted.

Table 9 Patients fitted with a prosthesis, all 2008 – 2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Number	702	729	731	688	702	803	812	704	685	714
Number fitted	297	301	315	288	286	322	338	293	321	313
Percentage fitted	42.3	41.3	43.1	41.9	40.7	40.1	41.6	41.6	44.6	43.8

Table 10 Proportion of patients with unilateral amputation fitted with a prosthesis by level (2008 – 2017)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA (%)	68.2	67.7	69.7	67.4	66.8	64.5	63.8	68	66.9	66.4
TFA (%)	24.8	24.1	32	26.1	26.3	23.2	28.1	23.9	20.9	26.4
Other (%)	23.5	17.1	11.5	50	19.1	21.7	31.3	30.8	12.2	0

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 11 Proportion of patients with bilateral amputation fitted with a prosthesis, bilateral (2008 – 2017)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bilateral – all levels %	23.4	23.7	29.8	31.5	33.6	18.8	25.3	24.5	28.2	38.7

Table 12 Bilateral patients fitted with a prosthesis by level 2017

	Bilateral TTA (n=62)	Bilateral TFA (n=51)	TTA & TFA (n=25)
Limb-fitted % (n=)	77.4% (n=48)	2% (n=1)	20% (n=5)

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 13 Sex and limb fitting outcome, 2016– 2017

	2016			2017		
	Unilateral TTA	Unilateral TFA	Bilateral	Unilateral TTA	Unilateral TFA	Bilateral
Total Males (n)	206	166	96	207	187	95
Total Females (n)	69	92	46	73	90	47
Males Limb-fitted (n)	139	40	23	151	56	43
Females Limb-fitted (n)	47	18	7	35	17	9
% of Males Limb-fitted	67.5	24.1	31.3	72.9	29.9	45.3
% of Females Limb-fitted	68.1	19.6	21.7	47.9	18.9	19.1

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.7 Prosthetic Rehabilitation Abandoned

There are a number of patients each year who are initially fitted with a prosthesis and start prosthetic rehabilitation but for whom prosthetic treatment is abandoned prior to their final discharge. The amputation level referred to in this section is the final level if re-amputation surgery has been carried out. Table 14 shows those people who have abandoned use of their prosthesis as a proportion of those initially fitted. Table 14 shows them as a proportion of all patients and they are included in the “not limb-fitted” group, as this is their final outcome on discharge.

The number of those abandoning prosthetic use during the rehabilitation period fluctuates from year to year (9.9% in 2017). Of these 31 patients, 7.5% were unilateral TTA (n=15), 16.1% unilateral TFA (n=14) and 1.8% were bilateral of varying levels (n=1).

Table 14 Prosthetic rehabilitation abandoned as a proportion of those initially fitted, 2012– 2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
All patients	29	8.4	22	6.4	23	6.4	32	9.6	22	6.8	31	8.1
Unilateral TTA	19	8.6	12	5.1	15	6.9	13	7.1	9	3.5	15	6.6
Unilateral TFA	7	10.5	7	9.7	3	3.2	15	21.7	9	14.3	14	14.9
Other	1	20	1	16.7	1	16.7	0	0	0	0	1	33.3
Bilateral	2	3.9	2	6.5	4	9.3	4	11.1	4	8.5	1	1.7

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.8 Mortality

Table 15 shows the proportion of amputees who died within 30 days of their amputation, this is their last amputation level (see also table 14 for overall)

Table 15 Mortality 2011 - 2017

	2011	2012	2013	2014	2015	2016	2017
Number of amputees	688	702	803	812	704	685	714
30 Day Mortality (N)	48	40	51	45	44	47	40
30 day mortality (%)	7	5.7	6.4	5.5	6.3	6.9	5.6

4.2.9 Final Outcome Summary

Table 16 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 outpatient treatment in 2017. Non-Limb-fitted now includes those who abandoned prosthetic use as that was their final outcome. Table 17 shows final outcome by aetiology and including those abandoned.

When grouped by aetiology, the greatest percentage of patients **not** being fitted with a prosthesis are those with blood borne infection (61%) and PAD (48%).

Table 16 Final outcome summary, 2014 - 2017

	2014		2015		2016		2017	
	N	%	N	%	N	%	N	%
Limb-fitted	338	41.6	293	41.6	278	40.7	313	43.8
Not Limb-fitted	357	44	318	45.2	314	45.8	318	43.5
Deceased	115	14.2	92	13.1	92	13.4	83	11.6
Unknown	2	0.3	1	0.1	1	0.1	0	0

Table 17 Final outcome by aetiology

Aetiology	Limb-fitted % (n)	Non limb- fitted % (n)	Abandoned % (n)	Deceased % (n)
PAD	35.9 (88)	47.8 (117)	3.7 (9)	12.7 (31)
Diabetes	45.1 (164)	39 (142)	3.6 (13)	12.4 (45)
Trauma or burns	66.7 (14)	19 (4)	4.8 (1)	9.5 (2)
Tumour	66.7 (6)	33.3 (3)	0	0
Congenital deformity	100 (3)	0	0	0
Drug abuse	75 (9)	16.7 (2)	8.3 (1)	0
Venous disease	60 (9)	6.7 (1)	13.3 (2)	20 (3)
Ortho non union	77.7 (7)	22.3 (2)	0	0
Ortho joint replacement	0	0	0	100 (1)
Ortho acquired deformity	100 (1)	0	0	0
Blood borne infection	22.2 (4)	61.1 (11)	16.7 (3)	0
Renal Failure	0	0	100 (1)	0
CRPS	55.6 (5)	22.2 (2)	11.1 (1)	11.1 (1)
Acute vascular incident	50 (3)	50 (3)	0	0
Not recorded (n=)	0	0	0	0

4.2.10 Unilateral and Bilateral Amputees

Table 18 shows the number of unilateral and bilateral amputees for the years 2012-2017. In this table bilateral amputees includes all amputees who were bilateral in the reported year.

The bilateral amputees are defined in more detail in Table 19 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 18 Unilateral and bilateral amputees, 2012 – 2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Number of amputees	702	100	803	100	812	100	704	100	685	100	714	100
Unilateral amputees	553	78.8	649	80.8	658	81	556	79	543	79.2	572	80.1
Bilateral amputees	149	21.2	154	19.2	154	19	148	21	142	20.8	142	20.9
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Table 19 Bilateral amputees, 2012- 2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Bilateral Total	149	100	154	100	154	100	148	100	142	100	142	100
Bilateral – prior amputation(s)	105	70.5	109	70.8	120	77.9	115	77.7	107	75.4	104	73.2
Bilateral – both in same episode	44	29.5	45	29.2	34	22.1	33	22.3	35	24.6	38	26.8

4.2.11 Bilateral Amputations

Demographic and final outcome data for all patients with bilateral amputation are shown below in Table 20

Table 20 Demographic profile and final outcome summary of patients with bilateral amputations at end of rehabilitation period

	Bilateral TTA	Bilateral TFA	TTA & TFA	Other
Number	62	51	25	4
Age (median, years)	63.5	71	65	59
Gender (Male) %, (n)	75.8	52.9	72	75
Aetiology				
PAD without diabetes % (n)	22.6 (14)	51 (26)	36 (9)	25 (1)
Diabetes % (n)	71 (44)	43.1 (22)	64 (16)	75 (3)
Other % (n)	6.5 (4)	5.9 (3)	0	0
Final Outcome				
Limb-fitted % (n)	77.4 (48)	2 (1)	20 (5)	0
Non Limb-fitted % (n)	19.4 (12)	82.4 (42)	64 (16)	75 (3)
Died % (n)	1.6 (1)	15.7 (8)	16 (4)	25 (1)
Abandoned % (n)	1.6 (1)	0	0	0
Missing	0	0	0	0

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

*Other=various combinations of amputation levels i.e. hip disarticulation and transfemoral etc.

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 21 below for 2008-2017.

Table 21 Bilateral amputations, 2008-2017

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bilateral TTA	16	14	13	13	16	13	8	7	15	14
Bilateral TFA	12	13	12	12	22	25	20	21	11	18
TTA & TFA	2	4	5	2	6	5	6	2	8	5
Other	3	4	1	2	0	2	0	3	1	1
Total	33	35	31	29	44	45	34	33	35	38

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.13 Falls

This is the second year that we have reported on falls, Table 22 shows falls recorded for all amputees and also for unilateral and bilateral amputees (all levels). Table 23 shows falls at home and both in hospital and 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 24 shows recorded falls in hospital for 2016 – 2017.

Falls have been reported for the second year and this has increased from 19.1% in 2016, to 23.4% in 2017.

Table 22 Reported falls in hospital for all amputees and also for unilateral and bilateral amputees (all levels)

	All Amputees (n= 714)	Unilateral (n= 572)	Bilateral - previously unilateral (n= 104)	Bilateral - same episode (n= 38)
In hospital % (n)	23.4% (167)	25.2% (144)	14.4 (15)	21.1 (8)

Table 23 Recorded falls at home for all amputees who had outpatient physiotherapy

Amputees Outpatient rehab	All Amputees (n= 358)	Unilateral (n= 307)	Bilateral - previously unilateral (n= 37)	Bilateral - same episode (n= 14)
At home % (n)	26.0% (93)	25.7% (79)	24.3% (9)	35.7% (5)

Table 24 Recorded falls for all amputees in hospital 2016 – 2017

Recorded falls	2016	2017
In hospital	19.1%	23.4%

4.2.14 Revisions and Re-amputations

The number of amputees having revision or re-amputation surgery is shown in Table 25. A revision is defined as further primary stump surgery which may involve bone, but does not change the level of amputation. A re-amputation is defined as further surgery of the primary stump which changes the level of amputation. Each revision and re-amputation is 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 2012-2017 are shown in Table 26

Table 25 Revisions and re-amputations, 2012-2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Amputations	746	100	848	100	846	100	737	100	720	100	752	100
Revisions	16	2.1	37	4.4	27	3.2	9	1.2	11	1.5	12	1.6
Re-amputations	57	7.6	59	7	49	5.8	46	6.2	44	6.1	59	7.8
Total revisions + re-amputations	73	9.8	96	11.3	76	9	55	7.5	55	7.6	71	9.4

Table 26 Transtibial to transfemoral re-amputations, 2012-2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Initial TTA	399	100	477	100	432	100	378	100	401	100	423	100
Re-amputated to TFA	57	14.3	43	9.0	43	10.0	42	11.1	40	10.0	54	12.8

Abbreviations: TFA=transfemoral, TTA=transtibial

4.2.1 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 27 Functional Co-Morbidities by Level and Aetiology

	Number	Min	Max	Mean	Lower Quartile	Upper Quartile	Median
All Patients	714	0	11	3.1	2.0	4.0	3.0
Level of Amputation							
Unilateral TTA	280	0	11	3.1	2.8	3.2	3.0
Unilateral TFA	277	0	11	3.1	2.9	3.4	3.0
Other	15	0	11	3.1	2.0	3.0	4.0
All Bilateral	142	0	9	3.3	2.0	4.0	3.0
Bilateral TTA	62	0	8	3.4	3.0	3.8	3.0
Bilateral TFA	51	1	6	3.2	2.8	3.6	3.0
TTA & TFA	25	1	5	3.0	2.4	3.5	3.0
Aetiology							
PAD without diabetes	245	1	8	2.9	2.0	4.0	3.0
Diabetes	364	1	11	3.7	2.0	5.0	3.0
Other	105	0	6	1.4	0	2.0	1.0

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

Table 28 Functional Co-morbidities Mean Score, 2012 – 2017

	2012	2013	2014	2015	2016	2017
	Mean	Mean	Mean	Mean	Mean	Mean
All Patients	3.1	3	3.0	3.1	2.9	3.1
Unilateral TTA	3.3	2.9	3.0	3.1	2.9	3.1
Unilateral TFA	3.1	2.9	2.9	3.1	3.0	3.1
Other	2.3	2.3	2.5	0.8	3.0	3.1
All Bilateral	3.1	3.3	3.4	2.5	3.5	3.3
PAD without diabetes	3.1	2.8	2.8	2.9	2.7	2.9
Diabetes	3.7	3.6	3.6	3.8	3.4	3.7

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 2012-2017 are presented in Table 29. These figures relate to the number of modalities used: if a single amputee received more than one type of therapy these would both appear in the table.

Table 29 Type of compression therapy used, 2012-2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Elset 'S' bandage	16	2.6	6	1	5	0.8	11	2.1	2	0.4	2	0.4
Flowtron	15	2.5	11	1.7	11	1.8	6	1.1	9	1.7	6	1.1
Plaster cast	143	23.5	156	24.7	123	19.8	96	18.2	113	21.6	86	16.6
Shrinker sock	380	62.5	414	65.6	428	68.9	370	70.2	357	67.7	400	77.1
Silicone Sleeve	9	1.5	10	1.6	18	2.90	12	2.3	8	1.5	3	0.6
Other	6	1.0	2	0.3	0	0.00	0	0	0	0	0	0
PPAM*	39	6.4	32	5.1	36	5.80	32	6.1	38	7.2	22	4.2
Total	607	100	631	100	621	100	527	100	527	100	519	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

5.2 Early Walking Aids

The types of Early Walking Aids (EWA) used in 2012-2017 are shown in Table 30. Note that these figures relate to the number of devices used: if a single amputee used more than one type of EWA, both would appear in the table.

Table 30 Type of EWA used, 2012-2017

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
AMA	2	0.6	0	0	0	0	0	0	1	0.3	0	0
Femurett	59	16.7	59	15.1	81	20.1	65	18.5	57	16.8	63	15.9
PPAM	291	82.4	331	84.9	323	80	287	81.5	281	82.7	333	83.8
Other	1	0.3	0	0	0	0	0	0	1	0.3	1	0.3
Total	353	100	390	100	404	100	352	100	340	100	397	100

Abbreviations: PPAM= Pneumatic Post Amputation Mobility Aid, AMA=Amputee Mobility Aid

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 31 Locomotor Capabilities Index by level, 2013 to 2017

2013	6/12 Pre-amp			Final Outcome			Change
	Basic	Adv.	Total	Basic	Adv.	Total	
Transtibial(n=233)	24	21	45	21	16	37	-8
Transfemoral(n=54)	23	17	40	20	11	31	-16
Bilateral (n=24)	21	18	39	17	13	30	-8
2014	6/12 Pre-amp			Final Outcome			Change
	Basic	Adv.	Total	Basic	Adv.	Total	
Transtibial (n=203)	23	21	44	20	17	37	-6
Transfemoral(n=78)	23	19	42	20	13	-12	-12
Bilateral (n=31)	22	15	37	17	11	28	-13
2015	6/12 Pre-amp			Final Outcome			Change
	Basic	Adv.	Total	Basic	Adv.	Total	
Transtibial (n=182)	23	23	46	21	19	40	-5
Transfemoral (n=70)	26	27	53	19	15	35	-18
Bilateral transtibial (n=30)	21.2	20.4	41.6	19.5	14.6	34.2	-7.5
Transtibial and transfemoral (n=5)	21.3	17	38.3	16.3	12	28.3	-10
2016	6/12 Pre-amp			Final Outcome			Change
	Basic	Adv.	Total	Basic	Adv.	Total	
Transtibial (n=175)	23	20	43	20	16	36	-7
Transfemoral(n=57)	26	23	49	20	13	34	-15
Bilateral (n=31)	21	18	39	18	12	31	-8
2017	6/12 Pre-amp			Final Outcome			Change
	Basic	Adv.	Total	Basic	Adv.	Total	
Transtibial (n=211)	22	18	40	18	14	31	-8
Transfemoral(n=88)	22	20	42	15	10	25	-17
Bilateral (n=55)	15	12	27	12	8	21	-6

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, lower quartile, median and upper quartile.

Only patients who were limb-fitted by inpatient or outpatient discharge are included in *days to casting* and *casting to delivery*.

Where patients 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 the patients 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 bilaterals amputated in same hospital admission is calculated from the date of first surgery.

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

For each milestone, and each group, the statistics represent available data including data from patients 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 32 Days to casting milestone, descriptive statistics, 2017

	All Patients	Unilateral TTA	Unilateral TFA	Bilateral TTA	TTA & TFA
Number Included	364	209	88	60	6
Lower Quartile	27	27	31	28	21
Upper Quartile	77	76	88	55	59
Median	43	42	51	37	39

Abbreviations: TFA=transfemoral, TTA=transtibial

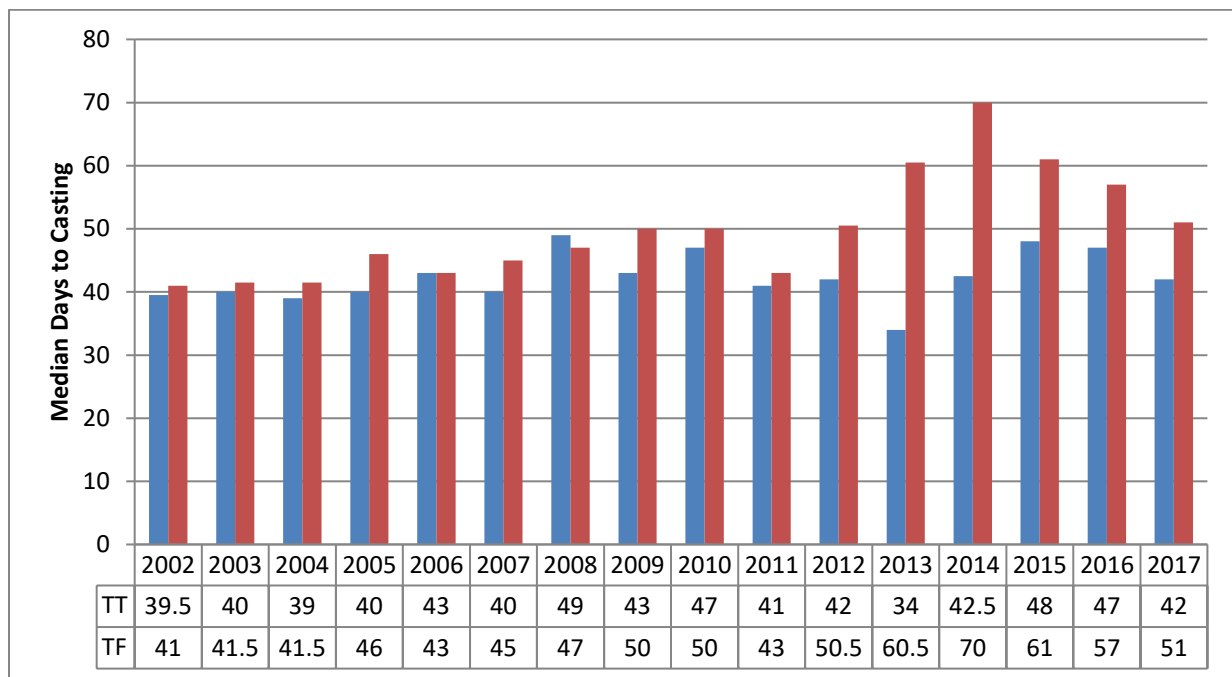


Figure 3 Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2002-2017

6.3 Casting to Delivery

Table 33 Casting to delivery milestone, descriptive statistics, 2017

	All	Unilateral TTA	Unilateral TFA	Bilateral TTA	TTA & TFA
Number Included	363	209	87	60	6
Lower Quartile	7	7	8	7	7
Upper Quartile	17	17	19	14	14
Median	10	10	13	8	10

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 34 Median casting to delivery milestone, 2003-2017

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA	14	14	14	14	13	14	13	10	10	9	8	9	9	8	10
TFA	14	14	14	15	14	15	15	15	14	14	13	15	14	14	13

Abbreviations: TFA=transfemoral, TTA=transtibial

6.4 Days to Inpatient Discharge: Fitted with a Prosthesis

Table 35 Days to inpatient discharge, patients fitted with a prosthesis, descriptive statistics

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	183	73	47
Lower Quartile	21	24.5	21
Upper Quartile	68	68.5	65
Median	40	39	34

Table 36 Median days to inpatient discharge, patients fitted with a prosthesis, 2003-2017 (Unilateral Only)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA	53	55	54	56	55	55	55	59	50	51.5	47.5	41.5	43	49	40
TFA	69	55.5	63.5	57	58	67.5	53	59	33	49.5	37	35	48	41	39

Abbreviations: TFA=transfemoral, TTA=transtibial

6.5 Days to Inpatient Discharge: Not Fitted with a Prosthesis

Table 37 Days to inpatient discharge, patients not fitted with a prosthesis, descriptive statistics, 2017

	Unilateral TTA	Unilateral TFA	Bilateral TTA	Bilateral TFA	TTA & TFA
Number Included	78	163	13	41	17
Lower Quartile	26.7	19	11	20.5	11
Upper Quartile	97.3	73	47	55	40
Median	44	40	36	38	24

Table 38 Median days to inpatient discharge, patients not fitted with a prosthesis, 2003-2017 (Unilateral Only)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA	37	52	51.5	66	60.5	62	61	45	53	64.5	45.5	42.5	40	59	44
TFA	41	42	47	52	46	47	51	41	34	36	32	34	43	53.5	40

6.6 Days from inpatient to outpatient discharge: Fitted with a prosthesis

Table 39 shows the days from inpatient discharge to outpatient discharge (length of outpatient rehabilitation) for all limb-fitted patients, however, this does not take into account the frequency or type of rehabilitation which will vary from hospital to hospital. The different models of care are described in appendix H.

Table 39 Days from inpatient discharge to outpatient discharge, limb-fitted amputees, 2017

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	185	73	46
Lower Quartile	49	68	21
Upper Quartile	162	214	140.5
Median	101	145	75.5

*1 Patient was LF at the TTA and TFA level

Table 40 Median Days from inpatient discharge to outpatient discharge, limb-fitted amputees 2012 - 2017

	2012	2013	2014	2015	2016	2017
Transtibial	92	96.5	111	99.5	91	101
Transfemoral	139	221	164.5	107	126	145
Bilateral	100	68	148.5	69	76	75.5

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 41 for 2002-2017. A line chart representing this data is shown in Figure 4

Table 41 Patients receiving compression therapy within 10 days of amputation (%), 2002– 2017

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA	66.2	67.8	65.5	54.4	47.5	52.8	55.7	51.1	55.3	73.5	66.9	68.6	62.2	63.7	61.7	64.5
TFA	49.3	63.8	55.3	49.5	43.6	41.6	45.2	40.2	39.1	47.2	57.8	37.2	35.5	22.1	41.	40.5

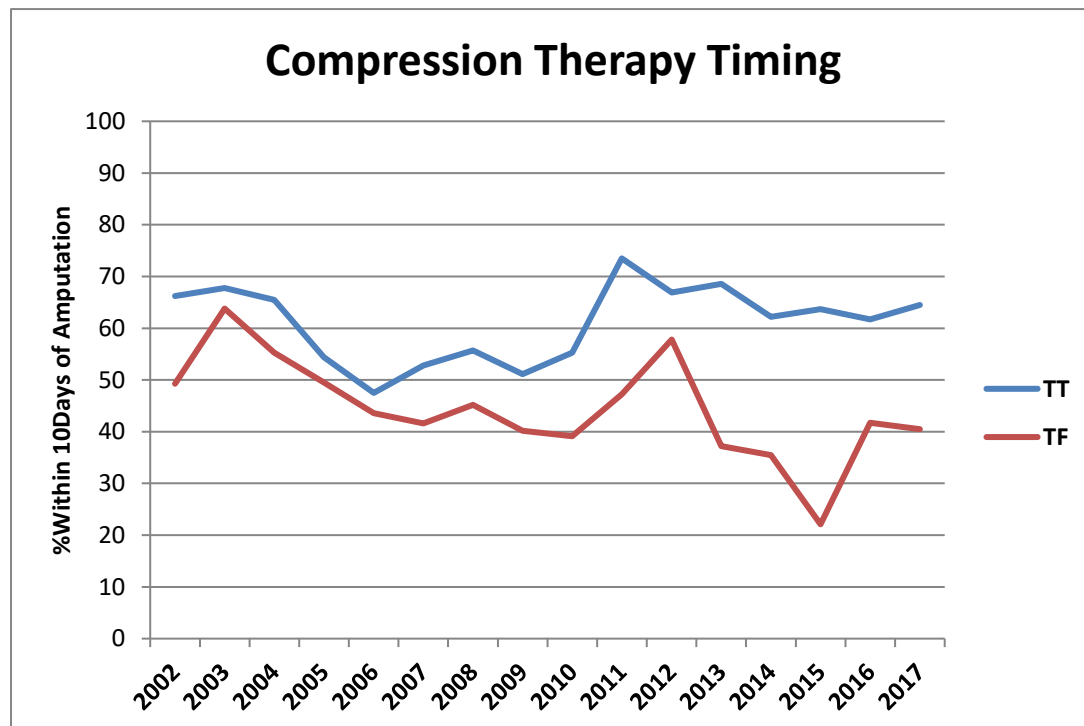


Figure 4 Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2002– 2017

7.3 Trends in Early Walking Aids

327 patients received Early Walking Aids (EWA) therapy, 24% received it within 10 days of amputation in 2016 and this is shown in Table 42 for 2002-2017, categorised by level of amputation. A line chart representing this data is shown in Figure 5

Table 42 Patients using EWAs within 10 days of amputation (%), 2002– 2017

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TTA	27.1	23.3	25.9	23.9	18.3	21.5	17.6	14.9	16.0	24.1	19.8	34.8	27.9	23.3	24.1	27.4
TFA	26.7	21.2	21.2	14.9	13.3	15.6	23.5	12.1	15.4	24.3	20.5	21.6	20.2	22.0	24.2	28.0

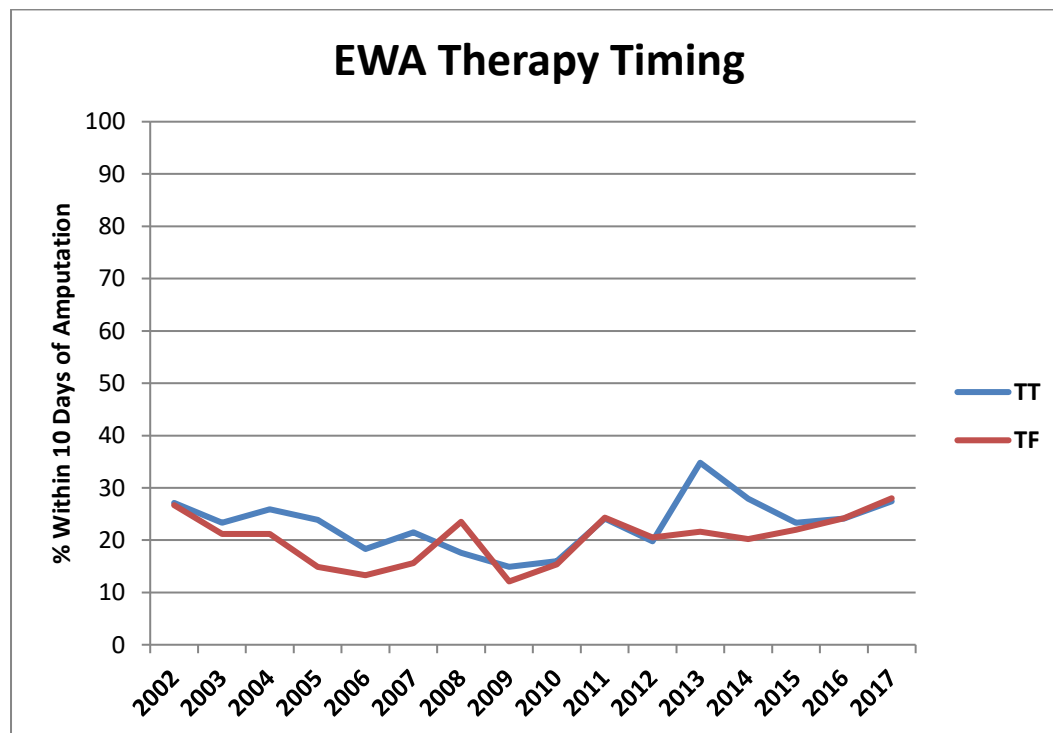


Figure 5 Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2002- 2017

8 Individual Hospital Summaries for 2017

8.1 Data Checking Summary

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

The number of amputees at each hospital and the data completeness are shown in Table 43.

Table 43 Data Checking Summary by Hospital

Hospital	Forms issued (n=)	Forms Missing (n=)	Forms complete (n=)	Forms Incomplete (n=)
Aberdeen Royal Infirmary	78	78	0	0
University Hospital Ayr	67	0	67	0
Borders General Hospital	1	0	1	0
Dumfries & Galloway Royal Infirmary	19	0	19	2
Forth Valley Royal Infirmary	39	0	39	0
Glasgow Royal Infirmary	14	1	13	1
Golden Jubilee National Hospital	2	0	2	0
Hairmyres University Hospital	112	0	112	0
Monklands University Hospital	1	0	1	0
Ninewells Hospital	107	1	106	2
Raigmore Hospital	37	2	35	0
Royal Alexandria Hospital	3	0	3	0
Royal Infirmary of Edinburgh	121	0	121	0
Queen Elizabeth University Hospital	164	0	164	9
St John's Hospital At Howden	2	0	2	0
Woodend hospital	2	0	0	0
Victoria Hospital (Kirkcaldy)	23	0	23	2
Royal Childrens Hospital (Yorkhill)	2	2	2	0
Outside Scottish Service	4	0	4	0
National	798	84	714	16
Queen Elizabeth Hospital Portsmouth	57	0	49	8

8.2 Key Performance Indicators by Hospital

All hospitals are included in Table 43 but the following tables (44-49) only include those centres with ≥ 10 amputation surgeries in 2017. This is to ensure data protection and validity of data analysis.

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. Heberton 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 see table 44. Detailed description of the models of care for each service can be found in Appendix H. Table 45 shows the total score for each centre.

Table 44 Model of care (MOC) indicators

Aspect of model of care identified as influential	Score
Immediate post-operative rigid dressing	0-2
Specialist physiotherapist in first 14 days	0-2
Daily inpatient gym session (Mon- Fri)	0-2
Inpatient gym session ≥ 1 hour	0-1
Prosthetic centre on site when in patient	0-1
Prosthetic provision as an in patient	0-2
Routine specialist physiotherapy outpatient service	0-1
Total	11

Scoring system: -

Aspects found to be statistically significant in previous study² have been given a higher rating

Score < optimum means aspect is only partially available

Table 45 Total model of care score for centres $n \geq 10$ (see Appendix H for more detail)

	AH	DGRI	FVRH	GRI	HH	QEUH	NH	RH	RIE/AA	VH	National median
Total moc score (max score = 11)	7	6	6	2	6	8	10	9	7	11	6.9

Key: Ayr Hospital (AH), Dumfries and Galloway Royal Infirmary (DGRI), Forth Valley Royal Hospital (FVRH), Glasgow Royal Infirmary (GRI), Hairmyres University Hospital (HH), Queen Elizabeth University Hospital (QEUH), Ninewells Hospital (NH), Raigmore Hospital (RH), Royal Infirmary Edinburgh/Astley Ainslie (RIE/AA), Victoria Hospital, Kirkcaldy (VH)

There are clear variations in milestones and outcomes between these larger centres. These are as follows: -

1. The percentage of amputations carried out at a transtibial (TTA) level in individual hospitals (centres, n≥10) shows significant variation, from 26% to 59%.
2. The proportion of patients being successfully fitted varies from 31.6% to 56.5% (centres, n≥10).
3. Time to provision of a prosthesis for both TTA and TFA levels has continued to improve nationally but, but this still varies hugely from centre to centre (unilateral TTA time to cast; QEUH 26 days, Ayr 58 days: unilateral TTA time to delivery; Raigmore 36 days; Hairmyers Hospital 74days)
4. The change in self reported community mobility from 6 months before surgery to the end of rehabilitation for unilateral TTA shows significant variation (Raigmore Hospital -13; GRI 9).

8.2.1 Age and FCI

Table 46 **Median Age, and FCI**

Hospital	Median Age (years)	Mean FCI
Aberdeen Royal Infirmary	**	**
University Hospital Ayr	69	3.6
Dumfries & Galloway Royal Infirmary	68	2.5
Forth Valley Royal Infirmary	64	3.6
Glasgow Royal Infirmary	52	1
Hairmyres University Hospital	66	3.1
Ninewells Hospital	68.5	2.9
Queen Elizabeth University Hospital	63	3.2
Raigmore Hospital	73	2.9
Royal Infirmary of Edinburgh	66	2.9
Victoria Hospital, Kirkcaldy	62	2.8
National	66	3.1

Abbreviations: FCI = Functional Co-morbidities Index (Appendix F), LF=Limb-fitted

**No data as Grampian not included in report.

8.2.2 Final Level of Amputation

The final level of Amputation at the end of the rehabilitation period is recorded in Table 47.

Table 47 Final level of Amputation at end of Rehabilitation by Hospital

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	**	**	**	**	**	**	**	**
University Hospital Ayr	49.3 (33)	29.9 (20)	0	9 (6)	9 (6)	3 (2)	0	100 (67)
Dumfries & Galloway Royal Infirmary	42.1 (8)	47.4 (9)	0	5.3 (1)	0	5.3 (1)	0	100 (19)
Forth Valley Royal Infirmary	59 (23)	30.8 (12)	0	10.3 (4)	0	0	0	100 (39)
Glasgow Royal Infirmary	46.2 (6)	46.2 (6)	7.7 (1)	0	0	0	0	100 (13)
Hairmyres University Hospital	32.1 (36)	40.2 (45)	1.8 (2)	5.4 (6)	12.5 (14)	5.4 (6)	2.6 (3)	100 (112)
Ninewells Hospital	26.4 (28)	50 (53)	1.8 (2)	12.3 (13)	6.6 (7)	2.8 (3)	0	100 (106)
Queen Elizabeth University Hospital	41.5 (68)	37.8 (62)	3 (5)	7.3 (12)	6.7 (11)	3.7 (6)	0	100 (164)
Raigmore Hospital	45.7 (16)	31.4 (11)	5.7 (2)	8.6 (3)	5.7 (2)	2.9 (1)	0	100 (35)
Royal Infirmary of Edinburgh	33.9 (41)	38 (46)	1.7 (2)	13.2 (16)	7.4 (9)	5.8 (7)	0	100 (121)
Victoria Hospital, Kirkcaldy	52.2 (12)	30.4 (7)	4.3 (1)	4.3 (1)	8.7 (2)	0	0	100 (23)
National	39.2 (280)	38.8 (277)	2.1 (15)	8.7 (62)	7.1 (51)	3.5 (25)	0.4(4)	100 (714)

Abbreviations: TFA=transfemoral, TTA=transtibial, **No data as Grampian not included in report

8.2.3 Final Outcome

Final outcome (at discharge from physiotherapy) by hospital are shown in Table 48

Table 48 Key Performance Indicators by Hospital

Hospital	LF % (n)	NLF % (n)	Aban % (n)	Died % (n)	Total (n)
Aberdeen Royal Infirmary	**	**	**	**	78
University Hospital Ayr	43.3 (29)	35.8 (24)	7.5 (5)	13.4 (9)	67
Dumfries & Galloway Royal Infirmary	31.6 (6)	47.4 (9)	10.5 (2)	10.5 (2)	19
Forth Valley Royal Infirmary	41 (16)	30.8 (12)	5.1 (2)	23.1 (9)	39
Glasgow Royal Infirmary	76.9 (10)	23.1 (3)	0	0	13
Hairmyres University Hospital	42 (47)	43.8 (49)	4.5 (5)	9.8 (11)	112
Ninewells Hospital	45.3 (48)	34.9 (37)	0	19.8 (21)	106
Queen Elizabeth University Hospital	43.9 (72)	36 (59)	9.8 (16)	10.4 ⁽¹⁷⁾	164
Raigmore Hospital	34.3 (12)	51.4 (18)	0	14.3 (5)	35
Royal Infirmary of Edinburgh	39.7 (48)	52.9 (64)	0	7.4 (9)	121
Victoria Hospital (Kirkcaldy)	56.5 (13)	43.5 (10)	0	0	23
National	43.8 (313)	40.1 (287)	4.3 (31)	11.6 (83)	714

Abbreviations: LF=Limb-fitted, NLF=Non Limb-fitted, Aban=Abandoned

**No data as Grampian not included in report.

8.3 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 49.

Table 49 Key Performance Indicators (milestones) by hospital, 2017

Hospital – unilateral TTA	% LF	Days to CT	Days to EWA	Days to Casting	Days to Delivery	In Patient Stay	Overall Length of Rehab	LCI-5 change score
University Hospital Ayr (n= 19)	63.6%	16	28	58	72	37	189	-8
Dumfries & Galloway Royal Infirmary (n= 4)	50%	6	8.5	38.5	51.5	14.5	132	4.5
Forth Valley Royal Infirmary (n=10)	47.8%	11	27	36	53	45.5	150.5	-11.5
Glasgow Royal Infirmary (n=5)	100%	7	15	29	38	8	142.5	9
Hairmyres University Hospital (n=29)	80.6%	7	12	54	74	25	167.5	-9
Ninewells Hospital (n=20)	78.6%	0	10	36.5	43.5	64	110	-9
Queen Elizabeth University Hospital (n=43)	67.6%	7	10	27	37	35	147	0
Raigmore Hospital (n=11)	68.8%	0	15.5	34	36	48.5	100	-13
Royal Infirmary of Edinburgh (n=18)	46.3%	8	20	55	63	70	116	-11
Victoria Hospital (Kirkcaldy) (n=11)	91.7%	0	14	37	44	40.5	77	0
National Median	66.4%	8	17	41	51	40	107	-8

Abbreviations: Compression therapy (CT), Early Walking Aid (EWA), Length of Stay (LOS) **No data as Grampian not included in report

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 casting to delivery of prosthesis
In Patient LOS	Median days from amputation surgery to discharge from inpatient care
Overall Length of Rehab	Median days from amputation surgery to discharge from outpatient care

Figure 6 Days from surgery to commencing compression therapy (CT) and early walking aid (EWA) use in unilateral TTAs by hospital

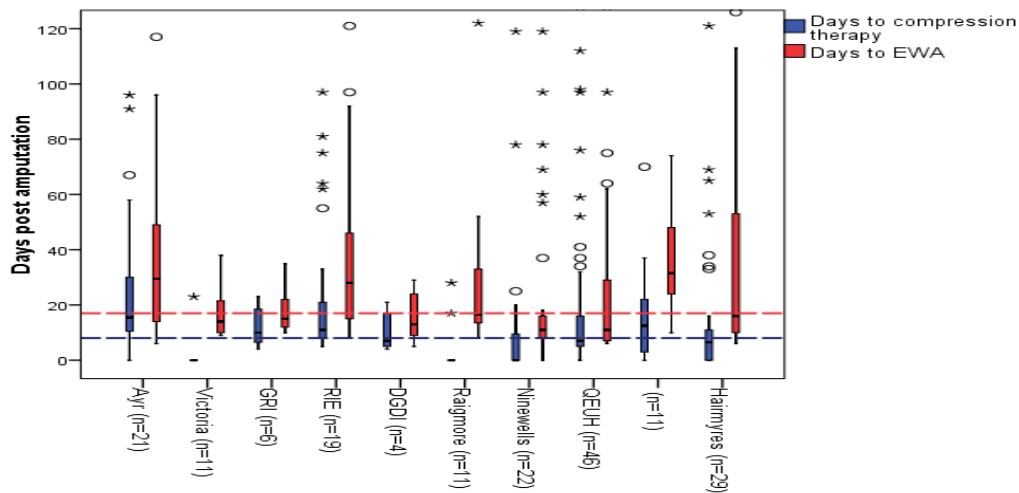


Figure 7 Days from surgery to cast and delivery of a prosthetic limb in unilateral TTA's by hospital

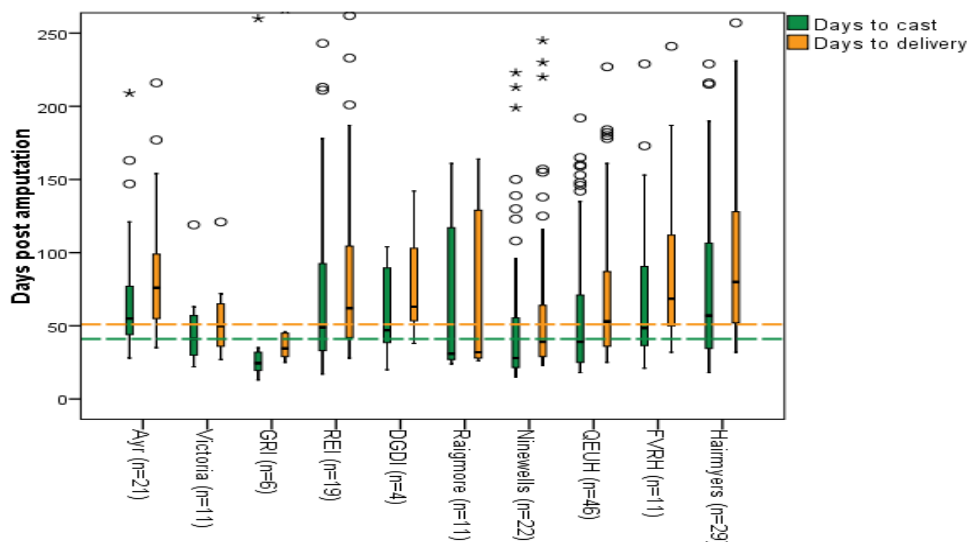
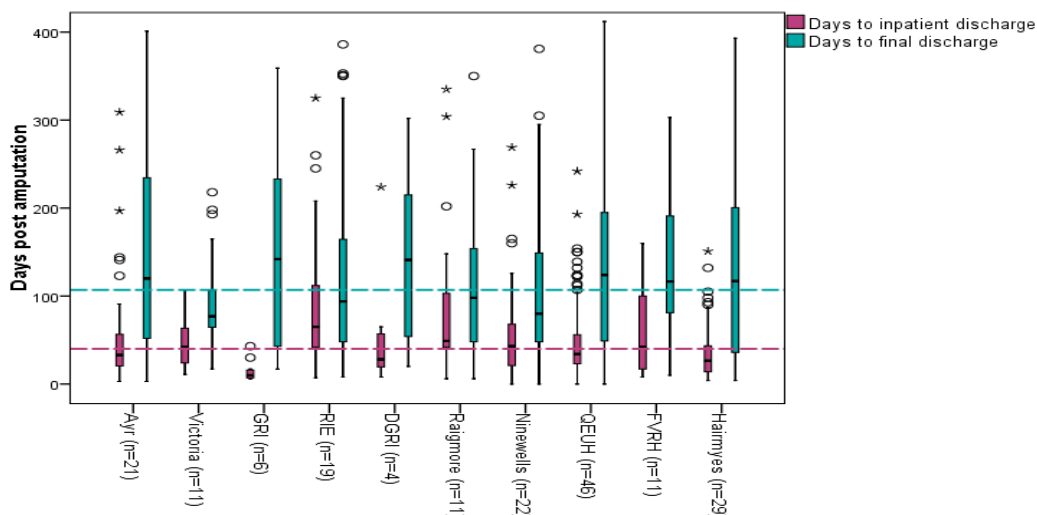


Figure 8 Days from surgery to inpatient and final discharge from physiotherapy in unilateral TTAs by hospital



9 Limb -fitting Centres

9.1 Hospital to Limb fitting centre

Each of the five limb fitting centres receives referrals depending upon their geographical location. Table 50 shows which limb-fitting centre each hospital refers to; the number of amputees in 2016 from each hospital, and the percentage Limb-fitted at each centre categorised into unilateral transtibial (TTA) and unilateral transfemoral (TFA) level.

Table 50 Limb-fitting centres, referring hospitals and % limb-fitted

Limb-fitting Centres (LFC)	Referring hospital (n= number of amputees in 2017)	% Limb-fitted Unilateral TTA	% Limb-fitted Unilateral TFA
WestMARC (n=356) (NHS GG&C, NHS Forth Valley, NHS Dumfries and Galloway, NHS Lanarkshire and NHS Ayrshire and Arran)	Queen Elizabeth University Hospital (n= 164)	67.6	22.6
	Glasgow Royal Infirmary (n=14)	100	66.7
	Royal Alexandria Hospital (n=3)	50	100
	Monklands University Hospital (n=1)	100	n/a
	Hairmyres Hospital (n=112)	80.6	26.7
	Forth Valley Royal Hospital (n=39)	47.8	16.7
	Dumfries and Galloway Royal Infirmary (n=19)	50	11.1
	Royal Hospital for Children (Yorkhill) (n=2)	n/a	100
	Golden Jubilee National Hospital (n=2)	n/a	100
Ayr (n=67) WestMARC satellite clinic	Ayr University Hospital (n=67)	63.6	10
SMART (n=124) (NHS Lothian, NHS Borders)	Royal Infirmary of Edinburgh (n=121)	46.3	34.8
	St John's Hospital, Livingstone (n=2)	100	n/a
	Borders General (n=1)	n/a	100
TORT (n=130) (NHS Tayside, NHS Fife)	Ninewells Hospital (n=107)	78.6	26.4
	Victoria Hospital, Kirkcaldy (n=23)	91.7	14.3
Raigmore (n= 37) (NHS Highland)	Raigmore Hospital (n=37)	68.8	9.1
MARS (n=80) (NHS Grampian)	Aberdeen Royal Infirmary (n=78)	**	**
	Woodend Hospital (n=2)		
Portsmouth (n=57)	Queen Alexandra Hospital, Portsmouth	89.3	50

Abbreviations: TFA=transfemoral, TTA=transtibial, **No data as Grampian not included in report

9.2 Milestones by Limb-fitting centre

The number of, and milestones data for limb-fitted unilateral transtibial amputees are presented for each hospital in Table 51.

Table 51 Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre

Limb fitting Centre	Days to CT	Days to EWA	Days to Casting	Days to Delivery	In Patient LOS	Overall Length of Rehab
WestMARC (NHS GG&C) (n= 100)	7	12.5	36	50	33	154
Ayr (satellite clinic of WestMARC) (n= 21)	16	28	58	72	37	189
SMART (n=21)	8	19.5	55	63	70	116
TORT (n=33)	0	10.5	37	44	48	106
Raigmore (n=11)	0	15.5	34	36	48.5	100
MARS	**	**	**	**	**	**
National Median	8	17	41	51	42	141.5
Portsmouth Enablement Centre (n=)	11	56	92	117	18.5	221

Abbreviations: TTA=transtibial, Compression therapy (CT), Early Walking Aid (EWA), Length of Stay (LOS)

**No data as Grampian not included in report

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 casting to delivery of prosthesis
In Patient LOS	Median days from amputation surgery to discharge from inpatient care
Overall Length of Rehab	Median days from amputation surgery to discharge from outpatient care

10 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 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>.
- 3 Scott H, Patel R. Benchmarking Primary Lower Limb Amputee Services for Years 2004, 2005 and 2006.' ScotRET Prosthetics Service Group. 2009.
- 4 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.
- 5 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.
- 6 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.
- 7 Gauthier-Gagnon C, Grise M. Tools to measure outcome of people with a lower limb amputation: Update on the PPA and LCI. *J Prosthetics Orthot* 2006;**18**(1S):61–7. Doi: 10.1097/00008526-200601001-00007.
- 8 Broomhead P, Dawes D, Hale C, Lambert A, Quinlivan D, Shepherd R. Evidence Based Clinical Guidelines for the Physiotherapy Management of Adults with Lower Limb Prostheses. *Rehabilitation* 2003;**3**(November):1–80. Doi: 10.1053/S0003-9993(03)00269-7.
- 9 Scopes J, Tisdale L, Cole MJ, Hayes S, Ostler C, Cummings J, et al. The BACPAR outcome measures toolbox: a step towards standardising outcome measures for physiotherapist working with lower limb amputees. *Physiotherapy* 2015;**101**:e1357–8. Doi: 10.1016/j.physio.2015.03.1293.
- 10 Dawson I, Divers C, Furniss D. PPAM-aid Clinical Guidelines for Physiotherapists', SPARG. 2008.
- 11 Bouch, E., Burns, K., Geer, E., Fuller, M. and Rose A. Guidance for the multi disciplinary team on the management of post-operative residuum oedema in lower limb amputees. 2012.
- 12 Smith DG, McFarland L V, Sangeorzan BJ, Reiber GE, Czerniecki JM. Postoperative dressing and management strategies for transtibial amputations: a critical review. *J Rehabil Res Dev* 2003;**40**(3):213–24. Doi: 10.1097/00008526-200407001-00005.
13. Smith S, Pursey H, Jones A, Baker H, Springate G, Randell T, Moloney C, Hancock A, Newcombe L, Shaw C, Rose A, Slack H, Norman C. (2016). 'Clinical guidelines for the pre and post-operative physiotherapy management of adults with lower limb amputations'. 2nd Edition. Available at <http://bacpar.csp.org.uk/>

11 Appendices

11.1.1 Appendix A Project work

Completed projects: -

Stuart W, Hussey K, Ross P and Smith F (2012) 'Indicators of poor outcome following major amputation.' (publication pending) Further information available from Mr Wesley Stuart, Consultant vascular Surgeon, Western Infirmary, Glasgow (wesley.stuart@ggc.scot.nhs.uk)

Hebenton J (2012) 'Has centralisation of the Vascular Service in Glasgow been successful? A physiotherapists perspective'. Local audit, Western Infirmary, Glasgow. Further information available from Mrs Joanne Hebenton, Specialist Physiotherapist, Westmarc, Glasgow (joanne.hebenton@ggc.scot.nhs.uk)

McNaughton M, Robertson F, Ross M, Smith F, Smith S and Whitehead L (2012) 'Exercise Intervention for the Treatment of Patients with Intermittent Claudication.' Scottish Physiotherapy Amputee Research Group, Glasgow.
(<http://www.knowledge.scot.nhs.uk/sparg.aspx>)

Davie-Smith F, Paul L, Nicholls N, Stuart WP, Kennon B (2016) The impact of gender, level of amputation and diabetes on prosthetic fit rates following major lower extremity amputation. Prosthet Orthot Int 0309364616628341, first published on February 5, 2016 as doi:10.1177/0309364616628341

PPAM aid Project

Joanne Hebenton completed work on the Chartered Society of Physiotherapy (CSP) Funded project 'How do models of care in Scotland impact on the use of the PPAM aid in Scotland?'. A final report was submitted to CSP in November 2015 and the results are now being written up for publication (see poster on website for results on timing of PPAM aid use <http://www.knowledge.scot.nhs.uk/sparg.aspx>). This was a collaborative project with NHS GG&C, SPARG and Caledonian University.

Orthopaedic Project

Joanne Hebenton completed work on the BACPAR Funded project 'Rehabilitation outcomes after lower limb amputation in Scotland - all aetiologies other than PAD and/or diabetes.' in November 2016. This has been written up as a poster and is available on SPARG website (<http://www.knowledge.scot.nhs.uk/sparg.aspx>).

11.1.2 Appendix B

List of SPARG Database reporting facilities

Facility to check entered data only: -

Amputee Details

Previous amputations

LCI5 Mobility Outcome

Functional Co-morbidities Index

Other issues

Home circumstances

Check final outcome

Check important dates

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

11.1.4 Appendix D

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		

11.1.5 Appendix E 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 can not 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	<input type="checkbox"/>	No	<input type="checkbox"/>
Osteoporosis	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Asthma	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Chronic Obstructive Pulmonary Disease, Acquired Respiratory Distress Syndrome, Emphysema	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Angina	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Congestive Heart Failure (or heart disease)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Heart Attack (myocardial infarction)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Neurological disease e.g. Multiple Sclerosis or Parkinson's	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
CVA or TIA	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Peripheral Arterial Disease	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Diabetes Type I and II	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Upper gastrointestinal disease (ulcer, hernia, reflux)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Depression	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Anxiety or panic disorders	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Visual impairment (cataracts, glaucoma, macular degeneration)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Hearing impairment (very hard of hearing even with hearing aids)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Degenerative disc disease including, back disease, spinal stenosis or severe chronic back pain	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Obesity and/or BMI > 30 (Pre-op weight in Kg/height in metres ²)				
Weight (Kg)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Height (metres)				
BMI =				
Please see Guidance Notes	Score (Yes = 1, No = 0)	<input type="text" value=" / 18"/>		

11.1.6 Appendix F Data Cleaning Steps

- Remove records which are marked as missing
- Checked, flagged and fixed DOBs in current year and age >100
- Check, flagged and fix date of amputation
- Check Amputees with right and left amputations are marked as bilaterals
- Check milestones are calculated from final surgery
- Check if LF then final outcome is LF (1) or Abandoned (3).
- Where DOB, date of amputation, etc are left blank then these are flagged and marked as "Missing"

11.1.7 Appendix G

Models of Care Summary for 2017

Scoring system

Aspect of model of care identified as influential	Scoring system	Score
	Aspects found to be statistically significant in previous study ² have been given a higher rating i.e. 2 Score < optimum means aspect is only partially available	
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 xs 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 = limbfitted, 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 physiotherapy outpatient service	0 = not routine, 1 = routine	1
Maximum score		11

QUEEN ELIZABETH UNIVERSITY HOSPITAL, NHS GREATER GLASGOW & CLYDE: Vascular Unit

Following an amputation, patients at QEUH will receive treatment from a specialist physiotherapist (2). Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is not routinely used. Multi-disciplinary team working is complemented by regular MDT meetings, with a discharge co-ordinator and MDT ward rounds.

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). 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). At QEUH, there is an on-site prosthetic centre (Westmarc) (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) twice a week 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 access physiotherapy on discharge.

MOC Score = 8/11

QUEEN ELIZABETH UNIVERSITY HOSPITAL, NHS GREATER GLASGOW & CLYDE: Orthopaedic Unit

Following an amputation, patients at QUEH (Ortho) will receive treatment from orthopaedic physiotherapist (whilst on Ward) and specialist amputee physiotherapist (1) once they start GYM treatment. They will remain in their amputating bed during their inpatient rehabilitation. A post-operative rigid dressing is not routinely used. Multi-disciplinary team working is complemented by regular MDT meetings. These are not attended by a discharge co-ordinator.

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 two treatment sessions daily, Monday to Friday (2), with an average total treatment time of 180 minutes (1). Patients who are appropriate for prosthetic input will routinely be discharged after their first casting. At QUEH, there is an onsite prosthetic centre; WestMARC (1).

Patients who are appropriate for prosthetic input will have access to out-patient physiotherapy follow-up at WestMARC, their onsite limb-fitting centre. They will see a specialist physiotherapist (1) twice a week 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 access physiotherapy on discharge.

MOC Score = 6/11

GLASGOW ROYAL INFIRMARY, NHS GREATER GLASGOW & CLYDE

Following an amputation, patients at GRI will receive treatment from a non-specialist physiotherapist. Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is not routinely used. There is no formal Multi-disciplinary team (MDT) meetings/working.

As an 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. Patients who are appropriate for prosthetic input will routinely be discharged before their first casting. At GRI, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site which is WestMARC.

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) twice a week 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 Score = 2/11

ROYAL ALEXANDRA HOSPITAL, NHS GREATER GLASGOW & CLYDE

Following an amputation, patients at RAH will receive treatment from a non-specialist physiotherapist. Rehabilitation commences in their amputating bed and, where appropriate, will continue in a slow-stream rehab bed. A post-operative rigid dressing is not routinely used. No formal multi-disciplinary team working occurs.

As an in-patient, physiotherapy will take the form of one-to-one, ward based sessions. Patients will routinely receive one treatment session daily (1), Monday to Friday, with an average

treatment session lasting 30-45 minutes. Discharge timing will be planned on an individual basis. At RAH, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site, which is WestMARC.

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 twice a week and have access to community outreach, clinical psychology and specialist OT services (1).

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 Score = 2/11

INVERCLYDE ROYAL HOSPITAL, NHS GREATER GLASGOW & CLYDE

From 2017, all patients who would have been amputated at Inverclyde Hospital are now amputated in QEUH (see service description above).

Patients who are appropriate for prosthetic input will routinely be discharged from QEUH after their first casting and will attend WestMARC for their prosthetic care. Patients who are appropriate for prosthetic input will have access to out-patient physiotherapy follow-up at IRH or Westmarc. They will see a specialist physiotherapist twice a week.

Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input in QEUH, but will only access physiotherapy on discharge as required. This will be provided via a domiciliary service

MOC Score = n/a outpatient service only

HAIRMYRES UNIVERSITY HOSPITAL, NHS LANARKSHIRE

Following an amputation, patients at Hairmyres Hospital will receive treatment from a specialist physiotherapist (2). Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is used post-operatively but not routinely (1), usually for a ten day period. Multi-disciplinary team (MDT) working is complemented by regular MDT meetings and MDT ward rounds. These are not attended by a discharge co-ordinator.

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). Patients who are appropriate for prosthetic-fitting will routinely be discharged before primary prosthetic review. At Hairmyres, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site which is WestMARC.

Patients who are appropriate for prosthetic input will have access to routine out-patient physiotherapy follow-up at their nearest acute hospital. They will see a specialist physiotherapist (1) twice a week.

Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but will only access physiotherapy on discharge as required. This will be provided via a domiciliary service.

MOC Score = 6/11

ROYAL INFIRMARY EDINBURGH / ASTLEY AINSLIE HOSPITAL, NHS Lothian

Following amputation, patients at RIE will receive treatment from a non-specialist physiotherapist. In RIE patients will be seen by the in-reach team from Astley Ainslie Hospital and, if assessed as having rehabilitation potential will be transferred to an amputee rehabilitation bed at AAH from 7 – 21 days post op. At AAH they will receive treatment from a specialist physiotherapist (1). A post-operative rigid dressing is not routinely used. Multidisciplinary team working is complemented by regular MDT meetings and MDT ward rounds. These are not attended by a discharge coordinator.

As an inpatient at RIE, physiotherapy will take the form of x 2 per week Gym sessions with the in-reach physiotherapists. Occasional ward sessions may be provided by the surgical team physiotherapists. Following transfer to AAH, physiotherapy will take the form of one-to-one and group sessions based mainly in a physiotherapy gym. Patients will receive up to two sessions daily, Monday to Friday (1), with an average total daily treatment time lasting 100 minutes (1).

At AAH there is an on-site prosthetic centre; SMART Centre (1). Patients will routinely be discharged 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.

PATIENTS CAN BE SENT HOME TO HEAL.

MOC Score = 7/11

NB inpatient score reduced as patients are treated in early post-operative period by non-specialist physiotherapists for reduced time supported by an in-reach service until transfer to specialist rehabilitation beds.

NINEWELLS HOSPITAL, NHS TAYSIDE

Following an amputation, patients at Ninewells Hospital will receive treatment from a specialist physiotherapist (2). Rehabilitation will commence in their amputating bed and, if suitable for prosthetic fitting, they will move to an amputee rehabilitation bed, of which there are ten. A post-operative rigid dressing is routinely used (2) for up to 7 day period. Multi-disciplinary team working is complemented by regular MDT meetings and MDT ward rounds. These are not attended by a discharge co-ordinator.

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, increasing to two per day if for prosthetic fitting with an average total daily treatment time of 120 minutes (1). Patients will routinely be discharged after prosthetic fitting (2) although this is beginning to change and some patients are being discharged home to be limb fitted as an outpatient. At Ninewells, there is an on-site prosthetic service (1) - TORT Centre.

Prosthetic candidates do not routinely access out-patient physiotherapy follow-up. Patients will receive a phone call at three weeks post-discharge and, if out-patient or community physiotherapy is required, this will be arranged accordingly.

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.

PATIENTS CAN BE SENT HOME TO HEAL.

MOC Score = 10/11

FORTH VALLEY ROYAL HOSPITAL, NHS FORTH VALLEY

Following an amputation, patients at FVRH will receive treatment from a specialist physiotherapist (2). Patients who are for prosthetic fitting will receive it in their amputating bed. Rehabilitation for patients who are not for prosthetic fitting occurs in a slow-stream rehabilitation bed. A post-operative dressing is routinely used by 2/3 of surgeons (1). Multi-disciplinary team working is complemented by daily ward rounds. These are not attended by a discharge coordinator.

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 suitable for prosthetic fitting will routinely receive one treatment session daily (1), Monday to Friday. Patients not appropriate for prosthetic fitting will routinely receive daily treatment sessions three to five times a week. The average treatment session lasts 60 minutes (1).

Patients who are appropriate for prosthetic-fitting will routinely be discharged before primary prosthetic review. At FVRH, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site which is WestMARC. After in-patient discharge, prosthetic candidates will have access to physiotherapy after in-patient discharge at the acute hospital. They will see a specialist physiotherapist (1) twice a week.

Patients who are not appropriate for prosthetics will receive the same level of in-patient input, but will only access physiotherapy on discharge as required. This will be provided via domiciliary services or at a day hospital.

MOC Score = 6/11

RAIGMORE HOSPITAL, NHS HIGHLAND

Following an amputation, patients at Raigmore Hospital will receive treatment from a specialist physiotherapist (2). Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is routinely used (2), for a 21 day period. Multi-disciplinary team (MDT) working is complemented by regular MDT meetings. These are not attended by a discharge co-ordinator.

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). Patients who are appropriate for prosthetic-review will routinely be discharged after prosthetic fitting (2). At Raigmore, there is an on-site prosthetic centre (1).

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 Score = 9/11

VICTORIA HOSPITAL, KIRKCALDY, NHS FIFE

Following an amputation, patients at VHK will receive treatment from a specialist physiotherapist (2). Rehabilitation will occur in their amputating bed. VHK also serves as a rehabilitation unit for amputees from other hospitals e.g. Ninewells Hospital. A post-operative rigid dressing is routinely used (2), usually for a ten day period. Multi-disciplinary team working

is complemented by regular MDT meetings and MDT ward rounds. These are not attended by a discharge co-ordinator.

As an in-patient, physiotherapy will take the form of group based sessions, based mainly in the therapy gym. Patients will routinely receive one treatment session daily (2), Monday to Friday, with an average treatment session lasting 60 minutes (1). Patients who are appropriate for prosthetic fitting will routinely be transferred, as an in-patient, to Ninewells Hospital where there is on-site prosthetic service (1). In-patient rehab will continue at Ninewells until prosthetic-fitting (2) and they follow the rehab pathway used at Ninewells.

Prosthetic candidates routinely access specialist out-patient physiotherapy follow-up at Victoria Hospital following discharge from Ninewells (1).

Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but will only access physiotherapy on discharge as required. This will be provided via a domiciliary service. When required, patients will receive daily non-specialist physiotherapy for two weeks via VHK Discharge team. After this, they will receive ongoing community physiotherapy as rehabilitation goals indicate.

MOC Score = 11/11

NB Fife patients are no longer all having surgery in VH, many are transferred to Ninewells for their amputation (in 2017, n=23 in VH, n= 43 in Ninewells), indeed from 2018 onwards all amputation surgery has been carried out in Ninewells Hospital. It appears that more complex and higher level amputations were carried out in Ninewells in 2017 and this may be related to the difference in outcomes between the 2 services.

AYR HOSPITAL, NHS AYSHIRE & ARRAN

Following an amputation on the vascular ward, patients at Ayr Hospital will receive treatment from a specialist physiotherapist (2). Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is not routinely used. Multi-disciplinary team (MDT) working is complemented by regular MDT ward rounds. These are not attended by a discharge co-ordinator.

As an in-patient, physiotherapy will take the form of both one-to-one and group based sessions. Physiotherapy sessions will take place both on the ward and in the therapy gym. Patients will routinely receive two treatment sessions daily (2), Monday to Friday, with average treatment time lasting 60 minutes (1). Patients who are appropriate for prosthetic-review will routinely be discharged before their first casting. At Ayr, there is a satellite prosthetic service available to patients (1).

On occasion an amputation will occur under the orthopaedic team at Ayr or Crosshouse Hospitals. Those patients will receive daily physiotherapy from a non-specialist amputee physiotherapist with guidance from the specialist amputee physiotherapy team.

A patient requiring longer-term rehabilitation will be transferred to one of five downstream/community hospitals (Arran War Memorial Hospital, Ayrshire Central Hospital in Irvine, Biggart Hospital in Prestwick, East Ayrshire Community Hospital in Cumnock or Girvan Community Hospital). Those patients will receive regular physiotherapy from a non-specialist amputee physiotherapist with guidance from the specialist amputee physiotherapy team.

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 Score = 7/11

NB Theatre dressings are left in place x 1 -2 weeks so it is not until these are changed that an assessment of the wound can be made and compression therapy and walking with an EWA can begin. These delays may be an influencing factor in patients being fitted much later in Ayr than at other centres (10 weeks compared to 5 weeks at other centres).

DUMFRIES & GALLOWAY ROYAL INFIRMARY, NHS DUMFRIES & GALLOWAY

Following an amputation, patients at DGRI Hospital will receive treatment from a specialist physiotherapist (2). Rehabilitation will initially occur in their amputating bed. However, once surgically fit, dependent on rehab needs and discharge planning, patients may be transferred to a rehabilitation unit either in DGRI or a community hospital. Whilst there is provision for rehabilitation beds for amputees, their physiotherapy input remains specialist.

A post-operative rigid dressing is not routinely used. Multi-disciplinary team (MDT) working is complemented by regular MDT meetings. These are not attended by a discharge co-ordinator.

As an in-patient, physiotherapy will take the form of both one-to-one and group based sessions. Patients will routinely receive two treatment sessions daily, Monday to Friday (2), with an average treatment session lasting 60 minutes (1). There is no specific protocol/pathway for time of discharge in patients' hospital stay i.e. pre-cast, post-cast, after limb-fitting (1). At DGRI, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site which is WestMARC.

Prosthetic candidates will have access to out-patient physiotherapy follow-up at their nearest acute hospital, DGRI or Galloway Community Hospital. They will see a physiotherapist more than once a week, this may be a specialist, dependent on location.

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.

MOC Score = 6/11

ABERDEEN ROYAL INFIRMARY, NHS GRAMPIAN

Following an amputation, patients at ARI will receive treatment from a specialist physiotherapist (2). Rehabilitation will begin in their amputating bed with those suitable for a prosthesis moving to a 6 bed rehabilitation unit at Woodend Hospital once wound is deemed satisfactory. A post-operative rigid dressing is not routinely used. Multi-disciplinary team working is complemented by weekly MDT meetings at Woodend site. These are not attended by a discharge co-ordinator.

Patients assessed as suitable for prosthetic fitting will have physiotherapy in the form of gym based sessions (both 1:1 and group sessions). Patients will routinely receive one treatment session four days a week (1), with an average treatment session lasting 45 minutes. These patients will be discharged routinely after prosthetic fitting (2). However, if wound healing is delayed, patients may be discharged and re-admitted to Woodend Hospital once they are able to commence EWA and prosthetic rehabilitation. Physiotherapy at Woodend Hospital is provided by staff travelling from ARI with support from 0.4 HCSW based permanently at Woodend. The prosthetic service is at M.A.R.S, Woodend Hospital (1).

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.

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.

On referral from medical staff, patients are offered an early pre amputation home visit with OT and physiotherapy staff.

PATIENTS CAN BE SENT HOME TO HEAL.

MOC Score = 6/11

QUEEN ALEXANDRA HOSPITAL, PORTSMOUTH HOSPITALS NHS TRUST

Following an amputation, patients at Queen Alexandra Hospital (QAH) will receive treatment from a non-specialist physiotherapist. Rehabilitation commences in their amputating bed and, if the patient requires more input to enable discharge, will continue in a slow-stream rehab bed at a community hospital. Patients who are appropriate for prosthetic-fitting will routinely be discharged before primary prosthetic review and prosthetic rehab will commence as an outpatient. A post-operative rigid dressing is not routinely used. No formal multi-disciplinary team working occurs.

As an in-patient, physiotherapy will take the form of one-to-one, ward based sessions. Patients will routinely receive one treatment session daily (1), Monday to Friday, with an average treatment session lasting 30 minutes. Discharge timing will be planned on an individual basis based on transfer and wheelchair independence and wound healing. There is no on-site prosthetic centre at QAH and subsequently they will be referred to their nearest site, which is the Portsmouth Enablement Centre (PEC).

Patients who are appropriate for prosthetic input will have access to out-patient physiotherapy follow-up at PEC, their nearest limb-fitting centre. They will see a specialist physiotherapist (1) twice a week either one to one or in a group setting as appropriate. The average treatment session lasts 60 minutes

Patients who are not appropriate for prosthetic fitting will receive the same level of in-patient input but would access community rehabilitation, if required, on discharge.

MOC Score = 2/11

Helen Scott, Team Lead Physiotherapist WestMARC, QEUH

Joanne Hebenton, Specialist Physiotherapist, WestMARC, QEUH

John Colvin, Clinical Service Manager and Clinical Scientist, Westmarc, Glasgow

David Morrison, Lead Prosthetist, Westmarc, Glasgow

Fiona Davie-Smith, Clinical Co-ordinator Specialist Prosthetics Service

Brian Kennon, Consultant Diabetologist, QEUH, Glasgow

Keith Hussey, Consultant Vascular surgeon, QEUH, Glasgow

Francine McCafferty, Prosthetist, SMART Centre, Edinburgh

Lynn Hutton, Rehabilitation Consultant, SMART Centre, Edinburgh

Marjory Robertson, Specialist OT, Westmarc, Glasgow

A Survey of the Lower Limb Amputee Population in Portsmouth 2017



SPARG
Scottish Physiotherapy Amputee
Research Group

June 2020

Authors

Dr F Davie-Smith, SPARG Research Officer

Ms J Hebenton, SPARG Executive Committee Chair

Ms H Scott, SPARG Chairman



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

1. Results: Demographic Profiles

1.1 Introduction

Portsmouth has a higher rate of amputations at both transtibial (Portsmouth 64.4%, Scotland 56.3%) and knee disarticulation levels (Portsmouth 8.5%, Scotland 1.1%). They have a lower incidence of Peripheral Arterial Disease (PAD) without diabetes (Portsmouth 30.5%, Scotland 35.1%) and a higher median age for this group of patients. Portsmouth also have a lower median age for patients with diabetic aetiology and so the difference in median age between these two aetiologies is 9 years in Portsmouth compared to 7 years in Scotland. Portsmouth takes longer to achieve use of compression therapy, commencing EWA's, delivery of a prosthetic limb and overall length of rehabilitation but do however, have the shortest in patient length of stay (table 47).

Portsmouth data shows slower rehabilitation milestones than the Scottish centres. This may be due to a shorter inpatient LoS which results in delays to commencing compression therapy and EWA, which further impacts on days to casting and delivery, the days to outpatient discharge being almost double. Rates of limb fitting are slightly higher than in the Scottish centres and this appears to be related to more patients with TFA being fitted and more women with TTA being limb fitted.

1.2 Amputee Details

1.2.1 Age and Sex Distribution

Table 1 Age and sex of amputee population

	2016	2017
No. of Amputees	53	57
No. of Amputee with Data	53	57
Age Lower Quartile	59	59
Age Median	66	67
Age Upper Quartile	77	75
Males %	67.9	78.9
Females %	32.1	21.1

1.2.2 Immediate cause of amputation

Table 2 Cause of amputation recorded by level and aetiology 2016 and 2017

Cause of amputation 2017		Ischaemia	Infection	Combo *	N/A**
		26 (44%)	9 (15%)	20 (34%)	4 (7%)
Level n= 59	TT	13	3	8	4
	TF	6	3	5	0
	TP	0	0	0	0
	HD	0	0	0	0
	KD	3	1	1	1
	AD	0	0	0	0
Aetiology n= 49	PAD without diabetes	11 (61%)	1(6%)	6 (33%)	0
	Diabetes	12 (39%)	7 (23%)	11 (35%)	1 (3%)
Cause of amputation 2016		Ischaemia	Infection	Combo *	N/A**
		14 (26%)	10 (19%)	20 (38%)	9 (17%)
Level n= 53	TT	8	7	10	6
	TF	2	3	8	2
	TP	0	0	0	0
	HD	0	0	0	0
	KD	0	0	2	1
	AD	0	0	0	0
Aetiology n= 38	PAD without diabetes	6 (16%)	0	2 (5%)	0
	Diabetes	7 (18%)	7 (18%)	15 (40%)	1 (3%)

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

1.2.3 Diabetic Amputees

The following table summarises the age and sex of amputees with aetiology of PAD with diabetes.

Table 3 Diabetic amputees, age and sex

	2016		2017	
	Diabetes	PAD without diabetes	Diabetes	PAD without diabetes
Number of Amputees	30	8	31	18
Number with age available	30	8	31	18
Age Lower Quartile	61	65	58	64
Age Median	69	75	64	73
Age Upper Quartile	77	82.5	69	83
N Male	20	6	24	15
N Female	10	2	7	3
Males %	66.6%	75%	77.4%	83.3%
Females %	33.3%	25%	22.6%	16.7%

1.2.4 Aetiology of Amputation

Table 4 Aetiology of amputation, 2016 and 2017

Aetiology	2016		2017	
	Number	%	Number	%
PAD without diabetes	8	15.1	18	30.5
Diabetes	30	56.6	31	52.5
Trauma/Burns	0	0	0	0
Tumour	1	1.9	0	0
Congenital Def	1	1.9	0	0
Orthopaedic – non union	0	0	2	3.4
Failed joint replacement	5	9.3	0	0
Aquired deformity	0	0	0	0
Blood Bourne	1	1.9	2	3.4
Venous Disease	2	3.8	2	3.4
Renal	0	0	2	3.4
Drug Abuse	1	1.9	2	3.4
CRPS	2	3.8	0	0
Acute Vascular Incident	2	3.8	0	0

1.2.5 Initial Level of Amputation

Table 5 shows the incidence of levels of amputation. For amputees who had bilateral amputations in the reported period, both amputations are included in the data. The number of levels recorded will therefore be greater than the number of amputees for any given year. The level indicates the initial level of the amputation. As there were no bilateral amputations in the same episode there is no difference between the number of amputees and the number of amputations.

Table 5 Initial Amputation Level

	2016		2017	
	N	%	N	%
Transtibial	31	58.5	38	64.4
Transfemoral	19	35.8	16	27.1
Knee Disarticulation	3	5.7	5	8.5
Total	53	100	59	100

1.2.6 Patients Fitted with a Prosthesis

The number of patients fitted with a prosthesis at final discharge is shown in Table 6. Unilateral patients limb-fitted are shown in Table 7, and bilateral patients are shown in Table 8. Table 9 gives more detail on bilateral patients fitted by their exact level of amputation. Table 10 shows the proportion of males and females who were fitted with a prosthesis. Those patients who have abandoned limb-fitting are not included in this "limb-fitted" patient group.

Table 6 Patients fitted with a prosthesis

	2016	2017
Number of patients	53	57
Number fitted	24	38
Percentage fitted	45.3	66.7

Table 7 Proportion of patients with unilateral amputation fitted with a prosthesis by level

	2016	2017
TTA (%)	66.7	89.3
TFA(%)	29	50
KD (%)	0	60

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 8 Proportion of patients with bilateral amputation fitted with a prosthesis

	2016	2017
Bilateral (all levels %)	20%	40%

Table 9 Bilateral patients fitted with a prosthesis by level 2016 and 2017

	Bilateral (n=)	Bilateral limb fitted % (n)	Limb fitted bilateral TTA % (n)
2017	5	60% (3)	60% (3)
2016	4	50% (2)	50% (2)

Abbreviations: TTA=transtibial

Table 10 Sex and limb fitting outcome

	2016				2017			
	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral
Total Males (n)	19	10	2	5	24	9	3	9
Total Females (n)	8	4	0	5	4	5	2	1
Males Limb-fitted (n)	11	3	0	1	22	5	0	4
Females Limb-fitted(n)	7	1	0	1	3	2	2	0
% of Males Limb-fitted	57.9	25	0	20	92	56	0	44
% of Females Limb-fitted	87.5	25	0	20	75	40	100	0

Abbreviations: TFA=transfemoral, TTA=transtibial

1.2.7 Prosthetic Rehabilitation Abandoned

There are a number of patients each year who are initially fitted with a prosthesis and start prosthetic rehabilitation but for whom prosthetic treatment is abandoned prior to their final discharge. The amputation level referred to in this section is the final level if re-amputation surgery has been carried out. Table 10 shows those people who have abandoned use of their prosthesis as a proportion of those initially fitted. Table 12 shows them as a proportion of all patients and they are included in the “not limb-fitted” group, as this is their final outcome on discharge.

Table 11 Prosthetic rehabilitation abandoned as a proportion of those initially fitted

	2016		2017	
	N	%	N	%
All patients	5	20.8	1	1.7
Unilateral TTA	3	16.67	1	3.6
Unilateral TFA	1	25	0	0
Unilateral KD	1	50	0	0

Abbreviations: TFA=transfemoral, TTA=transtibial

1.2.8 Mortality

Table 12 shows the proportion of amputees who died within 30 days of their amputation, this is their last amputation level (see also 13 for overall)

Table 12 Mortality (30 days)

	2016	2017
Number of amputees	53	57
30 Day mortality (N)	2	1
30 day mortality (%)	3.8	1.8

1.2.9 Final Outcome Summary

Table 13 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 outpatient treatment in 2016. Non-Limb-fitted now includes those who abandoned prosthetic use as that was their final outcome.

Table 13 Final outcome summary

	2016		2017	
	N	%	N	%
Limb-fitted	24	45.3	38	66.7
Not Limb-fitted	19	35.8	13	22.9
Deceased	10	18.9	6	10.5

Table 14 shows the final outcome by aetiology

Table 14 Final outcome by aetiology

Aetiology	LF %(n)	NLF %(n)	Aban %(n)	RIP %(n)
PAD without diabetes	50% (9)	33% (6)	6% (1)	11% (2)
Diabetes	77% (24)	10% (3)	0	13% (4)
Trauma/Burns	0	0	0	0
Tumour	0	0	0	0
Congenital Def	0	0	0	0
Orthopaedic – non union	0	0	0	0
Failed joint replacement	100% (1)	0	0	0
Acquired deformity	0	0	0	0
Blood Bourne	0	100% (1)	0	0
Venous Disease	50% (1)	50% (1)	0	0
Renal	100% (2)	0	0	0
Drug Abuse	100% (2)	0	0	0
CRPS	0	0	0	0
Acute Vascular Incident	0	0	0	0

1.2.10 Unilateral and Bilateral Amputees

The Table 15 shows the number of unilateral and bilateral amputees. In this table bilateral amputees includes all amputees who were bilateral in the reported year.

The bilateral amputees are defined in more detail in Table 17 where there are 2 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 15 Unilateral and bilateral amputees

	2016		2017	
	N	%	N	%
Number of amputees	53	100	57	100
Unilateral amputees	43	81.1	47	82.5
Bilateral amputees	10	18.9	10	17.5

Table 16 Bilateral amputees

	2016		2017	
	N	%	N	%
Bilateral Total	10	100	10	100
Bilateral – prior amputation(s)	10	100	8	80
Bilateral – both in same episode	0	0	2	20

1.2.11 Bilateral Amputations

Demographic and final outcome data for all patients with bilateral amputation are shown below in Table 17

Table 17 Demographic profile and final outcome summary of patients with bilateral amputations at end of rehabilitation period, 2017

	Bilateral TTA	Bilateral TFA
Number	5	1
Age (median, years)	64	63
Gender (Male) % (n)	100% (5)	100% (1)
Aetiology		
PAD % (n)	40% (2)	100% (1)
PAD + DM % (n)	60% (3)	0
Final Outcome		
Limb-fitted % (n)	60% (3)	0
Non Limb-fitted % (n)	0	100% (1)
Died % (n)	20% (1)	0
Abandoned % (n)	20% (1)	0

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

1.2.12 Bilateral Amputations in Same Episode of Care

Table 18 Bilateral amputations, 2007-2016

	2016	2017
Bilateral	0	2

1.2.13 Falls

Table 19 shows falls recorded for all amputees and also for bilateral amputees (all levels). Note this is not the number of falls but is the number of amputees who reported a fall during their rehabilitation period. Falls at home are only recorded for those who receive physiotherapy following in patient discharge.

Table 19 reported falls for all amputees and for bilateral amputees (all levels), 2016 and 2017

Recorded falls 2017	All Amputees (n= 57)	Bilateral – previously unilateral (n=0)	Bilateral – same episode (n=0)
In hospital %, (n)	17.5% (10)	n/a	n/a
At home %, (n)	14% (8)	n/a	n/a

Recorded falls 2016	All Amputees (n= 53)	Bilateral – previously unilateral (n=10)	Bilateral – same episode (n=0)
In hospital %, (n)	17% (9)	0	n/a
At home %, (n)	9% (5)	10% (1)	n/a

1.2.14 Revisions and Re-amputations

The number of amputees having revision or re-amputation surgery is shown in table 20. A revision is defined as further primary stump surgery which may involve bone, but does not change the level of amputation. A re-amputation is defined as further surgery of the primary stump which changes the level of amputation. Each revision and re-amputation is counted, therefore amputees who had a revision then a re-amputation would be included in both counts.

Table 20 Revisions and re-amputations, 2016-2017

	2016		2017	
	N	%	N	%
Amputations	53	100	57	100
Revisions	1	1.9	2	3.5
Re-amputations	0	0	2	3.5

1.2.15 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.

2016	Number	Min	Lower Quartile	Median	Upper Quartile	Max	Mean
All Patients	53	1	0	3	4	6	2.6
Level of Amputation							
Unilateral TTA	27	1	1	2	4	5	2.41
Unilateral TFA	14	0	1	2.5	4	4	2.28
Unilateral KD	2	3	3	3.5	4	4	3.5
All Bilateral	10	2	2	4	4	6	3.4
Bilateral TTA	4	2	2	2	3	4	2.5
Bilateral TFA	6	2	3	4	4	4	4
Aetiology							
PAD + Diabetes	8	0	2	4	4	2.6	3.16
PAD	30	1	1.5	3	3	4	2.5
Other	15	0	1	1	3	4	1.53

2017	Number	Min	Lower Quartile	Median	Upper Quartile	Max	Mean
All Patients	57	0	2	3	4	7	2.9
Level of Amputation							
Unilateral TTA	28	0	2	2.5	4	7	3
Unilateral TFA	14	0	2	3	4	6	2.9
Unilateral KD	5	2	2	2	2.5	3	2.2
All Bilateral	10	1	2	2.5	3.5	5	2.8
Bilateral TTA	5	2	2	2	3	3	2.4
Bilateral TFA	1	5	5	5	5	5	5
Aetiology							
PAD + Diabetes	31	1	2	3	4	7	3
PAD	18	2	2	3	4.3	5	3.2
Other	8	0	0.3	1.5	2	5	1.6

Table 20 Functional Co-Morbidities by Level and Aetiology, 2016 and 2017

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

2. Physiotherapy and Rehabilitation

2.1 Compression Therapy

Compression therapy of the residuum is widely used and figures are presented in Table 21. These figures relate to the number of modalities used: if a single amputee received more than one type of therapy these would both appear in the table.

Table 21 Type of compression therapy used, 2016-2017

	2016		2017	
	N	%	N	%
Shrinker sock	22	100%	19	63%
Elset S Bandage	0	0	7	23%
PPAM aid bag	0	0	4	14%
Total	22	100%	30	100%

2.2 Early Walking Aids

The types of Early Walking Aids (EWA) used are shown in Table 22. Note that these figures relate to the number of devices used: if a single amputee used more than one type of EWA, both would appear in the table.

Table 22 Type of EWA used, 2016-2017

	2016		2017	
	N	%	N	%
Femurett	4	14.8%	6	19%
PPAM	23	85.2%	26	81%
Total	27	100	32	100%

Abbreviations: PPAM= Pneumatic Post Amputation Mobility Aid

2.3 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 (Condie et al 2006).

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 (Franchignoni et al 2007). The LCI-5 has been found to reduce the ceiling effect associated with the LCI by 50% (Franchignoni et al 2004, Franchignoni et al 2007). 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 23 Locomotor Capabilities Index by level, 2016 and 2017

2016	6/12 Pre-amp			Final Outcome				
	Basic	Adv.	Total	Basic	Adv.	Total	Change	N
Transtibial	25	23	48	23	20	43	-5	18
Transfemoral	22	15	37	26	22	48	12	4
Knee Disarticulation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bilateral Transtibial	21	18	39	21	13	34	-5	2

2017	6/12 Pre-amp			Final Outcome				
	Basic	Adv.	Total	Basic	Adv.	Total	Change	N
Transtibial	20	18	38	21	18	39	0.2	24
Transfemoral	23	22	45	18	16	34	-10	6
Knee Disarticulation	24	24	48	21	20	41	-7	3
Bilateral Transtibial	20	19	39	24	22	46	7	2

3 Milestone Data

3.1 Statistics Presented

This section of the report deals with the statistical analysis of the rehabilitation milestones. The four rehabilitation milestones are shown in the table 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>

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

Only patients who were limb-fitted by inpatient or outpatient discharge are included in *days to casting* and *casting to delivery*.

Where patients 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 the patients 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 bilaterals amputated in same hospital admission is calculated from the date of first surgery.

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

For each milestone, and each group, the statistics represent available data including data from patients 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

*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.

3.2 Days to Casting

Table 24 Days to casting milestone, descriptive statistics, 2016 - 2017

2017	All Patients	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	39 *	25	6 **	3	3
Minimum	29	31	71	69	29
Lower Quartile	70	19	88	69	29
Median	100	92	109	100	108
Upper Quartile	123	129	121	-	-
Maximum	217	217	123	141	144
Mean	99	100	104	103	94

Abbreviations: KD=Knee Disarticulation, TFA=transfemoral, TTA=transtibial

* includes 2 x TF/TT not included in draft

**1 missing TFA

2016	All Patients	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	30	22	5	n/a	2
Minimum	26	26	53	n/a	42
Lower Quartile	53	47	64	n/a	42
Median	69	82	66	n/a	48.5
Upper Quartile	99	105	96	n/a	55
Maximum	349	349	140	n/a	55
Mean	85.4	88.7	88.8	n/a	48.5

3.3 Casting to Delivery

Table 25 Casting to delivery milestone, descriptive statistics, 2016 - 2017

2017	All	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	39 *	25	6 **	3	3
Minimum	4	4	15	14	16
Lower Quartile	17	19	16.5	14	16
Median	23	25	32	14	25
Upper Quartile	34	34.5	56.3	-	-
Maximum	97	97	87	19	33
Mean	28.9	29.6	38.2	15.7	24.7

*includes 2 x TF/TT not included in draft , 1 missing TFA

2016	All	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	29	21	5	n/a	
Minimum		7	20	n/a	23
Lower Quartile	14	14	21	n/a	23
Median	18	15	23	n/a	25
Upper Quartile	24	20	24	n/a	27
Maximum		46	76	n/a	27
Mean	22.1	19.5	32.8	n/a	25

Abbreviations: KD=Knee Disarticulation, TFA=transfemoral, TTA=transtibial

3.4 Days to Inpatient Discharge: Fitted with a prosthesis

Table 26 Days to inpatient discharge, patients fitted with a prosthesis, descriptive statistics, 2016 - 2017

2017	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	25	7	3	3
Minimum	5	8	13	3
Lower Quartile	14	28	13	3
Median	24	50	17	14
Upper Quartile	36	80	-	-
Maximum	209	267	120	161
Mean	32	76	50	59

2016	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	18	4	n/a	2
Minimum	5	5	n/a	18
Lower Quartile	8	6	n/a	18
Median	13.5	9.5	n/a	23
Upper Quartile	28.5	28	n/a	28
Maximum	80	34	n/a	28
Mean	21.1	14.5	n/a	23

Abbreviations: KD=Knee Disarticulation, TFA=transfemoral, TTA=transtibial

3.5 Days to Inpatient Discharge: Not Fitted with a Prosthesis

Table 27 Days to inpatient discharge, patients not fitted with a prosthesis, descriptive statistics, 2016 - 2017

2017	Unilateral TFA	Unilateral KD	Bilateral TFA	TT/KD
Number Included	6	2	1	2
Minimum	20	27	35	62
Lower Quartile				
Median	42.5	48	35	65
Upper Quartile				
Maximum	78	69	35	68
Mean	45	48	35	65

2016	Unilateral TFA	Bilateral TTA	KD/TF	Bilateral TFA
Number Included	6	2	2	3
Minimum	29	31	17	19
Lower Quartile	35	31		19
Median	43.5	33.5	39.5	45
Upper Quartile	65.25	36		69
Maximum	87	36	99	69
Mean	49.7	33.5	107.5	44.3

Abbreviations: KD=Knee Disarticulation, TFA=transfemoral, TTA=transtibial

*There was one unilateral TTA who was not fitted, therefore numbers not reported

3.6 Days from inpatient to outpatient discharge: Fitted with a prosthesis

Table28 Days from inpatient discharge to outpatient discharge, limb-fitted amputees, 2016 -2017

2017	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	21	6	1	3
Mean	193	97	364	94
Minimum	12	5	-	-
Lower Quartile	153	15	-	-
Median	200	78	364	-
Upper Quartile	255	200	-	-
Maximum	371	207	-	283

Missing data * 4 unilateral TTA, 1 unilateral TFA, 2 unilateral KD (final discharge dates)

2016	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA
Number Included	18	4	n/a	2
Mean	222.3	301.75	n/a	146.5
Minimum	69	190	n/a	138
Lower Quartile	158	205.75	n/a	138
Median	207	264.5	n/a	146.5
Upper Quartile	273	435	n/a	-
Maximum	381	488	n/a	155

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

4.1 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.

4.2 Trends in Compression Therapy

Of the patients receiving compression therapy, the percentage who received it within 10 days of amputation is shown in Table 29.

Table 29 Patients receiving compression therapy within 10 days of amputation (%), 2016– 2017

	2016	2017
All	36.4%	38%
TTA	43.8%	39%
TFA	0%	20%

2016 - 22 used compression therapy but only 8 within 10 days

2017 – 29 used compression therapy but only 11 within 10 days

4.3 Trends in early Walking Aids

Table 30 Patients using EWAs within 10 days of amputation (%)

	2016	2017
All	7.7%	6.5%
TTA	5.3%	9.5%
TFA	0%	0%

2016 - 26 used an EWA but only 2 within 10 days

2017 – 31 used an EWA but only 2 within 10 days

5 Hospital Summary, 2016

5.1 Data Checking Summary

The number of amputees and the data completeness are shown in Table 31.

Table 31 Data Checking Summary

Hospital	Total number	Number of Missing Forms	Number Complete	Number Incomplete
Portsmouth	57	0	57	

5.2 Key Performance Indicators

5.2.1 Final Outcome

Table 32 Key Performance Indicators

Hospital	LF % (n)	NLF % (n)	Aban % (n)	Died % (n)	Total
Portsmouth 2017	66.7% (38)	21.1% (12)	1.7% (1)	10.5 % (6)	57
Portsmouth 2016	45.3% (24)	26.4% (14)	9.4% (5)	18.9% (10)	53

Abbreviations: LF=Limb-fitted, NLF=Non Limb-fitted, Aban=Abandoned

5.2.2 Age, FCI, Females limbfit

Table 33 Median Age, and FCI for all; Limb Fitting of Females

Hospital	Median Age (years)	Mean FCI	% Females LF (n)
Portsmouth 2017	67	2.9	58.3% (7)
Portsmouth 2016	66	2.6	53% (9)

5.2.3 Final Level of Amputation

The final level of Amputation that a patient has at the end of their rehabilitation period is recorded in Table 34.

Table 34 Final level of Amputation at end of Rehabilitation by Hospital

	Unilateral TTA	Unilateral TFA	Unilateral KD	Bilateral TTA	Bilateral TFA	TT/TF	TT/KD	Total
Portsmouth 2017	28	14	5	5	1	2	2	57
Portsmouth 2016	27	14	2	4	4	-	2	53

5.3 Milestones (Unilateral transtibial amputees)

The number of, and milestones data for unilateral transtibial amputees are presented in Table 35.

Table 35 Key Performance Indicators (milestones)

Hospital	Days to CT	Days to EWA	Days to Casting	Days casting to delivery	In Patient Stay	Overall Length of Rehab
Portsmouth 2017	11	56	92	25	24	221
Portsmouth 2016	12	46	74.5	15	18.5	222

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 casting to delivery of prosthesis

In Patient Stay

Median days from amputation surgery to discharge from inpatient care

Overall Length of Rehab

Median days from amputation surgery to discharge from outpatient