A Survey of the Lower Limb Amputee Population in Scotland 2016

Public Report

SPARG
Scottish Physiotherapy Amputee Research Group

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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 Executive Summary

Executive Summary

This is the 24th 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 2016 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. Amputations at the knee disarticulation (through knee) level are reported within the transfemoral amputation numbers due to their similar rehabilitation needs.

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 exercise (Scott and Patel 2009). Each of the larger centres' (n≥10) models of care have been described according to criteria identified in the benchmarking report and agreed following consultation with SPARG members.

New additions to this report are as follows: -

- Revised reporting of aetiology (see Sections 3.2.2 and 3.2.4)
    - "Immediate cause of amputation" has been added and now reported as "ischaemia", "infection", "combination" (of ischaemia and infection) or "not applicable".
    - "Orthopaedic" category has been split into non-union, failed joint replacement and acquired deformity; "Chronic Regional Pain Syndrome" (CRPS) and "Acute Vascular Incident" (AVI) have been added; and "other" removed.
- Falls (see Section 3.2.13)
- Final Outcome by aetiology (see Table 14)
- Key Performance Indicators (KPIs) by Limb Fitting Centre (see Section 8)
- Data from Portsmouth Enablement Centre Data (see Section 8 and Appendix J). Portsmouth began collecting SPARG data in 2016 as part of a joint project with British Association of Chartered Physiotherapists in Amputee Rehabilitation (BACPAR).

National demographic data appear to be similar to 2015; any changes and trends are noted below. Where possible, comparisons are given in the body of the report for at least 6 years from 2011-2016.

For a second year due to restrictions on data governance there are no descriptions of those patients who underwent an amputation in the Grampian region, though the final number of amputees does include them.

Results

In 2016, there were 780 amputees in total. However, due to Grampian patients being excluded (n=93) and 2 other missing data sets, this report will discuss results in reference to 685 amputees. These 685

patients underwent 722 amputation procedure; some patients having had a re-amputation (to a higher level), or bilateral amputations during the same episode of care.

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 99.1%.

The median age in 2016 was 67 years at time of amputation, which is the same as 2014 but slightly lower than 2015 (68 years). The population were 69.5% males and 30.5% females, which is an increase in the % male from 2015 (66.5%) but still less than 2014 (71.9%). Peripheral arterial disease (without diabetes) and diabetes accounted for 86.9% of all amputations in this population.

Analysis of ‘immediate cause’ has revealed ischaemia to be the cause of amputation in 58% of all amputations, infection in 19% and a combination of infection and ischaemia in 18% (immediate cause was not applicable for 5% of all amputations). Further analysis showed that the immediate cause of amputation was ischaemia in 82% of those with an aetiology of peripheral arterial disease without diabetes (PAD) and in 48% of those with diabetes.

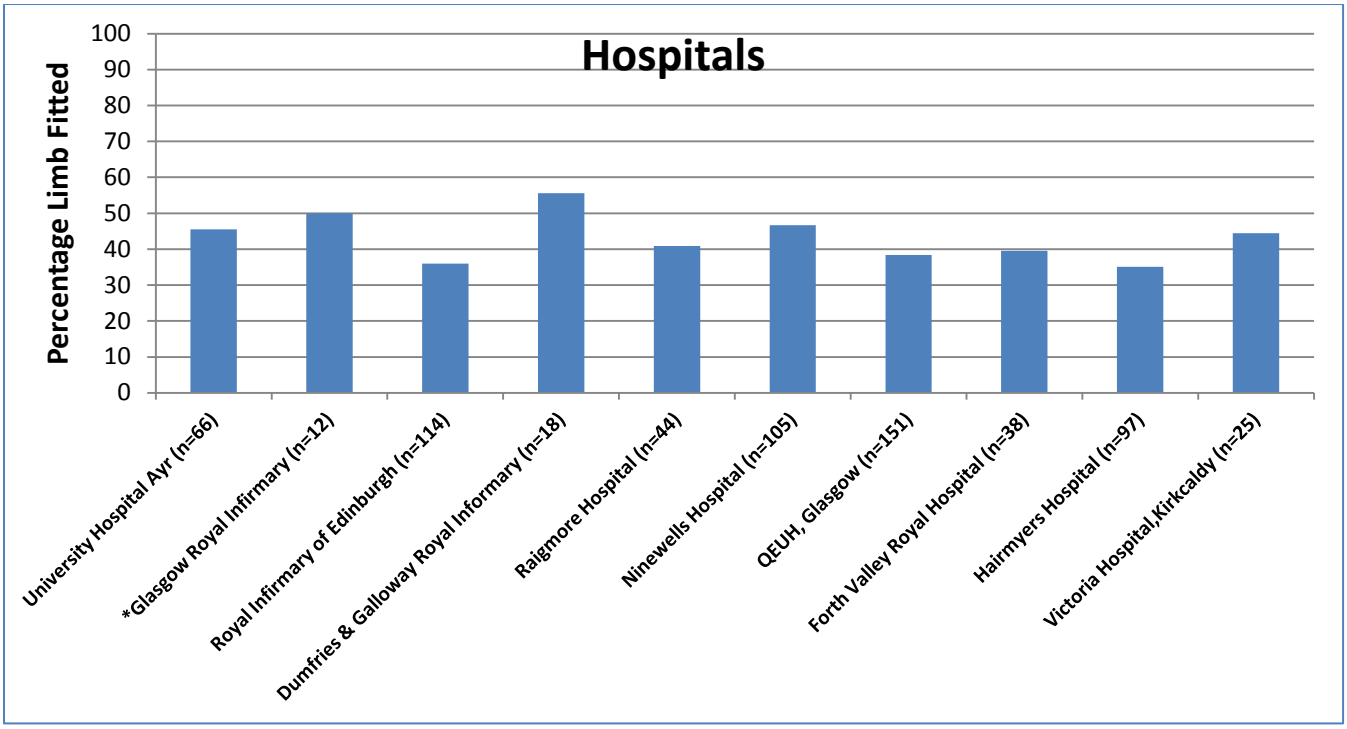
The proportion of patients with diabetes was 4% higher in 2016 (49.8%). The median age for both groups remains the same as 2015; the group with diabetes remain 4 years younger than those with amputation due to PAD (without diabetes).

There has been no change in the number of amputations following a failed joint replacement (n=4) since it was last recorded in 2004. It should be noted that the number of amputations with an aetiology of blood bourne infection has increased from 8 to 18, which is the highest ever recorded and there has also been an increase in venous disease from 5 in 2015 to 15 in 2016.

The percentage of amputations carried out at a transtibial (TTA) level in 2016 was 56%, however individual hospital data (centres, n≥10) show significant variation, from 29.9% to 66.6%.

The proportion of patients (all levels) fitted with a prosthesis is 44.6%. When examined by level, 66.9% of TTA and 20.9% of transfemoral (TFA) were fitted. When individual hospital data are examined, the differences in proportions of patients being successfully fitted are large, varying from 35.1% to 55.6% (centres, n≥10) (Figure 1). There has been an increase in the percentage of females limb-fitted (all levels) see table 10.

When grouped by aetiology, the greatest percentage of patients **not** being fitted with a prosthesis were those with PAD (without diabetes), 49%, blood bourne infection, 59%, and CRPS, 60%, and the highest mortality rate was in the group with diabetes, 16%.



*No amputations for PAD (+/-DM)

Figure 1 **Percentage of patients who were limb fitted in each of the hospitals (n>10)**
(Total number of patients with lower limb amputations at each hospital is shown in brackets)

The figures for prosthetic rehabilitation being abandoned during the rehabilitation period are reported (6.8% of all patients (n=22)), this is similar to 2014, following an increase in 2015. These were unilateral TTA=3.5% (n=9), unilateral TFA 14.3% (n=9) and bilateral 8.5% (n=4).These are the lowest figures recorded since 2001 at both transtibial and transfemoral levels.

Falls have been reported for the first time, 19% of patients had a fall as an inpatient, 13% fell at home and 5% had a fall both at home and in hospital. The majority of falls occurred at home at bilateral level.

In should be noted that there has been little variation in days from casting to delivery at transfemoral level however, there has been a steady reduction in days at transtibial level. This is thought to be due to limbs being delivered at fitting stage and cosmesis being added at a later date if requested.

Inpatient length of stay (LoS) for limb-fitted unilateral patients has risen by 6 days for TTA to 49 days and reduced by 2, for TFA to 41 days. However, it should be noted that there has been an increase in the LoS for non limb-fitted patients. LoS for non limb fitted patients at transtibial level increased by 19 days and by 10.5 days at transfemoral level in 2016 (TTA 59 days and TFA 53.5 days).

Discussion and conclusions

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.

Key messages from the 2016 report are: -

1. There is a slight reduction in the number of amputees, 803 in 2015 to 780 in 2016.
2. The immediate cause of amputation is ischaemia in 65% of all patients, in those with diabetes the cause is recorded as ischaemia in 48%, infection in 27% and as a combination of both in 25%.
3. There is an ongoing increase in the number of amputations with aetiology of diabetes from 39% in 2011 to almost 50% in 2016.
4. Patients with aetiology of Diabetes have the highest mortality rate at final discharge.
5. 2016 has the highest % of amputation at transtibial level since 2011 (56% in 2016) and a 4% reduction at transfemoral level, with little change in the number of re-amputations (11.1% in 2015, 10% in 2016).
6. There has been an overall increase in the number of patients limb-fitted (all levels) and at transtibial level but a 3% reduction in those fitted at transfemoral level.
7. The percentage of females limb-fitted has increased at all levels with 12% increase in those limb-fitted at TTA level. This now matches the percentage of males with TTA limb fitted.
8. Patients with PAD (without diabetes), CRPS or blood bourne infection have a lower rate of limb fitting than other aetiology groups.
9. There has been a reduction in the % abandoned at all levels but the largest reduction is at transfemoral level (21.7% in 2015, 14.3% in 2016)
10. There has been an increase in the use of rigid post-operative dressings for the first time since 2013, those with a TTA: 18.2% in 2015, 21.6% in 2016.
11. Limb fitted patients with bilateral TTA reported a similar mobility change score (LCI-5 = -8) to unilateral TTA (LCI-5 = -7) and a smaller change score than TFA (LCI-5 =-15, which is indicative of an improved recovery compared to unilateral TFA.
12. There has been a reduction in time to cast at both TT and TF levels, lowest for TF since 2011.
13. There has been a steady reduction in days cast to delivery at transtibial level since 2009 (14 days in 2008, 8 days in 2016). This may be due to limbs being delivered at fitting stage and cosmesis being added at a later date if requested.
14. Inpatient LoS has increased for limb-fitted TTA by 6 days but the greater increase in LOS is in the non limb-fitted group where it has increased by 19 days for TTA and 10.5 days for TFA.
15. Median days from inpatient to outpatient discharge have increased to 126 days for TFA and remain higher than TTA (91 days) and Bilateral (76 days), as they have reduced function and require more rehabilitation. This is also dependent on the available outpatient treatment time as defined by the models of care.
16. The % of patients receiving compression therapy in ≤ 10 days has increased to 84.6% for TTA but reduced to 15.4% for TFA.
17. There remains a wide variation in the KPI's between hospitals.

18. Portsmouth data shows slower rehabilitation milestones than in 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.

Points for further investigation/action: -

- The large variation in the proportion of amputees successfully limb fitted between centres continues to warrant further investigation by the local multidisciplinary teams.
- Key aspects of services that appear to improve speed and outcomes of rehabilitation after lower limb amputation, in particular, impact on limb fitting outcomes of inpatient rehabilitation and reasons for variations in prosthetic fabrication times between centres.
- Reducing median age and increasing proportion of people with diabetes and amputation
- Increase in drug abuse as reason for amputation
- Impact of standard sizes for TFA shrinker socks on time to starting compression therapy.
- Impact of change in pre-prosthetic assessment on the rate of abandonment for TFA

The full report can be accessed from the SPARG website (SPARG website: http://www.knowledge.scot.nhs.uk/sparg.aspx) or from the authors.

3 Results: Demographic Profiles

3.1 Introduction

National survey data are presented in this section. Where possible, comparisons are shown for 2007-2016. The total number of amputees for 2016 was 780; data is available for 685 of these amputees therefore included in the analysis. Missing data includes all data sets from Grampian Health Board (n= 93) and those forms not returned for data input (n=2).The total number of amputations, excluding Grampian was 722.

3.2 Amputee Details

3.2.1 Age and Sex Distribution

The 2016 survey contains data from 685 amputees. The data for numbers of amputees from 2007-2016 by age and gender is shown in Table1.

Table 1 Age and sex of amputee population, 2007- 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
No. of Amputees	699	741	746	740	700	708	809	819	803	780
No. of Amputee with Data	678	702	729	731	688	702	803	812	704	685
Age Lower Quartile	60	61	61	61	60	61	58	57	58	56
Age Upper Quartile	77	79	77	78	77	78	78	76	76	76
Age Median	69	70	70	70	70	70	69	67	68	67
Males %	64.2	62.1	64.5	67	65.9	66.4	66.5	71.9	66.5	69.5
Females %	35.8	37.9	35.5	33	34.1	33.6	33.5	28.2	33.5	30.5

3.2.2 Immediate cause of amputation

This is the first year that the cause of amputation has been recorded.

Table 2 Cause of amputation recorded by level and by aetiology

Cause of amputation 2016		**Ischaemia**	**Infection**	**Combination ***	**N/A****
		405 (58%)	136 (19%)	126 (18%)	35 (5%)
Level n= 702 (18 missing)	TT	206	93	72	20
	TF	195	38	51	12
	TP	0	0	0	1
	HD	2	2	0	2
	KD	2	2	3	0
	AD	0	1	0	0
Aetiology n= 625 (15 missing)	PAD without diabetes	213	17	31	0
	Diabetes	166	93	87	3

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

3.2.3 Diabetic Amputees

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

Table 3 Diabetic amputees, age and sex, 2015 & 2016

	2015		2016	
	Diabetes	**PAD without Diabetes**	**Diabetes**	**PAD without Diabetes**
Number of Amputees	315	286	340	253
Number with age available	315	286	340	253
Age Lower Quartile	57.8	63.5	59	62
Age Upper Quartile	74.0	79.4	76	80
Age Median	67.0	71.6	67	71
N Male	228	176	253	165
N Female	87	110	87	88
Males %	72.4	61.5	74.4	62.5
Females %	27.6	38.5	25.6	34.8

3.2.4 Aetiology of Amputation

The incidence of each aetiology recorded is shown in Table 4. Following review of the "other" category: from 2016, the aetiology "orthopaedic" was further categorised into: non-union; failed joint replacement and acquired deformity. With the addition of aetiologies; Chronic Regional Pain Syndrome (CRPS) and Acute Vascular Incident (AVI), the category "other" is no longer required. All of these aetiologies allow for more clarity around reason for amputation.

Table 4 Aetiology of amputation, 2011 – 2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
PAD without diabetes	309	44.9	293	41.7	332	41.3	319	39.3	286	40.6	267	37.1
Diabetes	269	39.1	295	42	351	43.7	378	46.5	315	44.7	358	49.8
Trauma or Burns	11	1.6	19	2.7	13	1.6	17	2.1	14	2	9	1.3
Tumour	12	1.7	10	1.4	13	1.6	16	2	8	1.1	9	1.3
Congenital deformity	4	0.6	3	0.4	2	0.3	5	0.6	5	0.7	2	0.3
Drug abuse	10	1.5	12	1.7	13	1.6	14	1.7	17	2.4	15	2.1
Venous disease	9	1.3	14	2	10	1.3	0	0	5	0.7	15	2.1
Orthopaedic	40	5.8	26	3.7	39	4.9	45	5.6	24	3.4	13	1.8
Orthopaedic – non union											8	1.1
Orthopaedic failed joint											4	0.6
Orthopaedic acquired deformity											1	0.1
Blood-borne infection	3	0.4	6	0.9	8	1	7	0.9	8	1.1	18	2.5
Renal Failure	5	0.7	7	1	4	0.5	1	0.1	2	0.3	4	0.6
CRPS*											5	0.7
Other **	15	2.2	14	2	17	2.1	10	1.2	13	1.9		
AVI											4	0.6
Not recorded	1	0.15	3	0.43	1	0.12	0	0.00	7	0.99	1	0.1
Total	688	100.0	702	100	803	100	812	100.0	704	100	720	100

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

**** Other: from 2016 this becomes Acute Vascular Incident (AVI)**

3.2.5 Initial Level of Amputation

Table 5 shows the incidence of six levels of amputation for the years 2011-2016. 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 5 Amputation Level, 2011-2016

	2011		2012		2013		2014		2015		2016	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Transtibial	406	56.6	399	53.5	477	56.3	432	51.1	377	51.2	401	56
Transfemoral	291	40.6	322	43.2	340	40.1	395	46.7	342	46.4	304	42
Transpelvic	0	0	3	0.4	1	0.1	0	0	1	0.1	1	0.1
Hip Disarticulation	8	1.1	8	1.1	11	1.3	6	0.7	5	0.7	6	0.8
Knee Disarticulation	12	1.7	13	1.7	17	2.0	13	1.5	12	1.6	7	1.0
Ankle Disarticulation	0	0	0	0	2	0.2	0	0	0	0	1	0.1
Other	0	0	0	0	0	0	0	0	0	0	0	0
Not recorded	0	0	1	0.1	0	0	0	0	0	0	0	0
Total	717	100	746	100	848	100	846	100	737	100	720	100

3.2.6 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, all 2007 – 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Number	678	702	729	731	688	702	803	812	704	685
Number fitted	312	297	301	315	288	286	322	338	293	321
Percentage fitted	44.6	42.3	41.3	43.1	41.9	40.7	40.1	41.6	41.6	44.6

Table 7 Proportion of patients with unilateral amputation fitted with a prosthesis by level (2007 – 2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TTA (%)	63.1	68.2	67.7	69.7	67.4	66.8	64.5	63.8	68	66.9
TFA (%)	29.3	24.8	24.1	32	26.1	26.3	23.2	28.1	23.9	20.9
Other (%)	61.5	23.5	17.1	11.5	50	19.1	21.7	31.3	30.8	12.2

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 8 Proportion of patients with bilateral amputation fitted with a prosthesis, bilateral (2007 – 2016)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bilateral – all levels %	28.2	23.4	23.7	29.8	31.5	33.6	18.8	25.3	24.5	28.2

Table 9 Bilateral patients fitted with a prosthesis by level 2016

	Bilateral TTA (n=58)	Bilateral TFA (n=43)	TTA & TFA (n=38)
Limb-fitted % (n=40)	60.3% (n=35)	0% (n=0)	13.2% (n=5)

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 10 Sex and limb fitting outcome, 2015– 2016

	2015			2016		
	Unilateral TTA	Unilateral TFA	Bilateral	Unilateral TTA	Unilateral TFA	Bilateral
Total Males (n)	201	167	96	206	166	96
Total Females (n)	69	114	49	69	92	46
Males Limb-fitted (n)	143	49	27	139	40	23
Females Limb-fitted (n)	39	20	9	47	18	7
% of Males Limb-fitted	71.1	29.3	28.1	67.5	24.1	31.3
% of Females Limb-fitted	56.5	17.5	18.4	68.1	19.6	21.7

Abbreviations: TFA=transfemoral, TTA=transtibial

3.2.7 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 11 shows those people who have abandoned use of their prosthesis as a proportion of those initially fitted. Table 13 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, 2011– 2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
All patients	23	6.6	29	8.4	22	6.4	23	6.4	32	9.6	22	6.8
Unilateral TTA	10	4.3	19	8.6	12	5.1	15	6.9	13	7.1	9	3.5
Unilateral TFA	8	11.7	7	10.5	7	9.7	3	3.2	15	21.7	9	14.3
Other	3	27.3	1	20	1	16.7	1	16.7	0	0	0	0
Bilateral	2	5.4	2	3.9	2	6.5	4	9.3	4	11.1	4	8.5

Abbreviations: TFA=transfemoral, TTA=transtibial

3.2.8 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 2010 - 2016

	2010	2011	2012	2013	2014	2015	2016
Number of amputees	731	688	702	803	812	704	685
30 Day Mortality (N)	54	48	40	51	45	44	47
30 day mortality (%)	7.4	7	5.7	6.4	5.5	6.3	6.9

3.2.9 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 14 shows final outcome by aetiology and including those abandoned.

Table 13 Final outcome summary, 2013 - 2016

	2013		2014		2015		2016	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Limb-fitted	322	40.1	338	41.6	293	41.6	278	40.7
Not Limb-fitted	365	45.5	357	44	318	45.2	314	45.8
Deceased	111	13.8	115	14.2	92	13.1	92	13.4
Unknown	5	0.6	2	0.3	1	0.1	1	0.1

Table 14 Final outcome by aetiology, 2016

Aetiology	Limb-fitted % (n)	Non limb-fitted % (n)	Abandoned % (n)	Deceased % (n)
PAD	33.6 (85)	49 (124)	3.6 (9)	13.8 (35)
Diabetes	41.8 (142)	40 (136)	2.3 (8)	15.9 (54)
Trauma or burns	33.3 (3)	44.4 (4)	22.2 (2)	0
Tumour	66.7 (6)	22.2 (2)	0	11.1 (1)
Congenital deformity	50 (1)	50 (1)	0	0
Drug abuse	73.3 (11)	20 (3)	6.7 (1)	0
Venous disease	66.7 (10)	33.3 (5)	0	0
Ortho non union	37.5 (3)	25 (2)	0	12.5 (1)
Ortho joint replacement	75 (3)	25 (1)	0	0
Ortho acquired deformity	100 (1)	0	0	0
Blood borne infection	23.5 (4)	58.8 (10)	11.8 (2)	5.9 (1)
Renal Failure	100 (4)	0	0	0
CRPS	40 (2)	60 (3)	0	0
Acute vascular incident	75 (3)	25 (1)	0	0
Not recorded (n=1)				

3.2.10 Unilateral and Bilateral Amputees

Table 15 shows the number of unilateral and bilateral amputees for the years 2011-2016. 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 16 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, 2011 – 2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
Number of amputees	688	100	702	100	803	100	812	100	704	100	685	100
Unilateral amputees	577	83.9	553	78.8	649	80.8	658	81	556	79	543	79.2
Bilateral amputees	111	16.1	149	21.2	154	19.2	154	19	148	21	142	20.8
Unknown	0	0	0	0	0	0	0	0	0	0	0	0

Table 16 Bilateral amputees, 2011- 2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
Bilateral Total	111	100	149	100	154	100	154	100	148	100	142	100
Bilateral – prior amputation(s)	82	73.9	105	70.5	109	70.8	120	77.9	115	77.7	107	75.4
Bilateral – both in same episode	29	26.1	44	29.5	45	29.2	34	22.1	33	22.3	35	24.6

3.2.11 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, 2016

	Bilateral TTA	Bilateral TFA	TTA & TFA	Other
Number	58	43	39	2
Age (median, years)	66.5	70	69	N/A
Gender (Male) %, (n)	74.1% (43)	65.1 (28)	64.1 (25)	0 (0)
Aetiology				
PAD without diabetes % (n)	19 (11)	53.5 (23)	23 (9)	0 (0)
Diabetes % (n)	72.4 (42)	37.2 (16)	74.4 (29)	100 (2)
Other % (n)	8.6 (5)	9.3 (4)	2.6 (1)	0
Final Outcome				
Limb-fitted % (n)	50 (29)	0 (0)	2.6 (1)	0
Non Limb-fitted % (n)	38 (22)	72 (31)	71.8 (28)	100 (2)
Died % (n)	8.6 (5)	28 (12)	20.5 (8)	0
Abandoned % (n)	3.4 (2)	0 (0)	5.1 (2)	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.**

3.2.12 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 18 below for 2007-2016.

Table 18 Bilateral amputations, 2007-2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bilateral TTA	23	16	14	13	13	16	13	8	7	15
Bilateral TFA	6	12	13	12	12	22	25	20	21	11
TTA & TFA	8	2	4	5	2	6	5	6	2	8
Other	0	3	4	1	2	0	2	0	3	1
Total	37	33	35	31	29	44	45	34	33	35

Abbreviations: TFA=transfemoral, TTA=transtibial

3.2.13 Falls

This is the first year that we have reported on 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.

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

Recorded falls	**All Amputees** (n= 685)	**Bilateral -** previously unilateral (n=107)	**Bilateral -** same episode (n=35)
In hospital % (n)	19 (131)	0	3 (1)
At home % (n)	13 (88)	5 (5)	14 (5)
Both % (n)	5 (31)	0	3 (1)

3.2.14 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.

Re-amputations from the transtibial to the transfemoral level for 2011-2016 are shown in Table 21

Table 20 Revisions and re-amputations, 2011-2016

	2011		**2012**		**2013**		**2014**		**2015**		**2016**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Amputations	717	100	746	100	848	100	846	100	737	100	720	100
Revisions	28	3.9	16	2.1	37	4.4	27	3.2	9	1.2	11	1.5
Re-amputations	33	4.6	57	7.6	59	7	49	5.8	46	6.2	44	6.1
Total revisions + re-amputations	61	8.5	73	9.8	96	11.3	76	9	55	7.5	55	7.6

Table 21 Transtibial to transfemoral re-amputations, 2011-2016

	2011		**2012**		**2013**		**2014**		**2015**		**2016**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Initial TTA	406	100	399	100	477	100	432	100	378	100	401	100
Re-amputated to TFA	33	8.12	57	14.29	43	9.01	43	9.95	42	11.1	40	10

Abbreviations: TFA=transfemoral, TTA=transtibial

3.2.15 Functional Co-morbidities Index

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

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

Table 22 Functional Co-Morbidities by Level and Aetiology, 2016

	Number	Min	Max	Mean	Lower Quartile	Upper Quartile	Median
All Patients	685	0	9	2.9	2	4	3
Level of Amputation							
Unilateral TTA	275	0	8	2.9	2	4	3
Unilateral TFA	258	0	9	3	2	4	3
Other	9	0	9	3	2	4	3
All Bilateral	142	0	7	3.5	2	5	3.5
Bilateral TTA	58	0	7	3.4	2	5	3.5
Bilateral TFA	43	1	6	3.2	2	4	3
TTA & TFA	39	1	7	3.8	3	5	4
Aetiology							
PAD without diabetes	358	0	8	3.4	2	5	3
Diabetes	267	0	9	2.7	1	4	3
Other	94	0	8	1.5	0	2	1

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

Table 23 Functional Co-morbidities Mean Score, 2011 – 2016

	2011	2012	2013	2014	2015	2016
	Mean	Mean	Mean	Mean	Mean	Mean
All Patients	3.1	3.1	3	3.0	3.1	2.9
Unilateral TTA	3.1	3.3	2.9	3.0	3.1	2.9
Unilateral TFA	2.8	3.1	2.9	2.9	3.1	3.0
Other	2.5	2.3	2.3	2.5	0.8	3.0
All Bilateral	3.7	3.1	3.3	3.4	2.5	3.5
PAD without diabetes	**3.1**	**3.1**	**2.8**	**2.8**	**2.9**	2.7
Diabetes	**3.8**	**3.7**	**3.6**	**3.6**	**3.8**	3.4

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

4 Physiotherapy and Rehabilitation

4.1 Compression Therapy

Compression therapy of the residuum is widely used and figures for 2011-2016 are presented in Table 24. 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 24 Type of compression therapy used, 2011-2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
Elset 'S' bandage	12	1.9	16	2.6	6	1	5	0.8	11	2.1	2	0.4
Flowtron	18	2.9	15	2.5	11	1.7	11	1.8	6	1.1	9	1.7
Plaster cast	132	21.8	143	23.5	156	24.7	123	19.8	96	18.2	113	21.6
Shrinker sock	371	59.7	380	62.5	414	65.6	428	68.9	370	70.2	357	67.7
Silicone Sleeve	12	1.9	9	1.5	10	1.6	18	2.90	12	2.3	8	1.5
Other	3	0.5	6	1.0	2	0.3	0	0.00	0	0	0	0
PPAM*	73	11.8	39	6.4	32	5.1	36	5.80	32	6.1	38	7.2
Total	621	100	607	100	631	100	621	100	527	100	527	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**

4.2 Early Walking Aids

The types of Early Walking Aids (EWA) used in 2011-2016 are shown in Table 25. 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 25 Type of EWA used, 2011-2016

	2011		2012		2013		2014		2015		2016	
	N	%	N	%	N	%	N	%	N	%	N	%
AMA	4	1.1	2	0.6	0	0	0	0	0	0	1	0.3
Femurett	42	11.2	59	16.7	59	15.1	81	20.1	65	18.5	57	16.8
PPAM	325	86.4	291	82.4	331	84.9	323	80	287	81.5	281	82.7
Other	1	0.3	1	0.3	0	0	0	0	0	0	1	0.3
Total	372	100	353	100	390	100	404	100	352	100	340	100

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

4.3 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 26 Locomotor Capabilities Index by level, 2012 to 2016

	6/12 Pre-amp			Final Outcome			
2012	**Basic**	**Adv.**	**Total**	**Basic**	**Adv.**	**Total**	**Change**
Transtibial (n=186)	24	20	44	21	15	36	-10
Transfemoral (n=53)	24	20	44	22	14	36	-12
Bilateral (n= 39)	22	17	39	17	10	27	-12

	6/12 Pre-amp			Final Outcome			
2013	**Basic**	**Adv.**	**Total**	**Basic**	**Adv.**	**Total**	**Change**
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

	6/12 Pre-amp			Final Outcome			
2014	**Basic**	**Adv.**	**Total**	**Basic**	**Adv.**	**Total**	**Change**
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

	6/12 Pre-amp			Final Outcome			
2015	**Basic**	**Adv.**	**Total**	**Basic**	**Adv.**	**Total**	**Change**
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 & Transfemoral (n=5)	21.3	17	38.3	16.3	12	28.3	-10

	6/12 Pre-amp			Final Outcome			
2016	**Basic**	**Adv.**	**Total**	**Basic**	**Adv.**	**Total**	**Change**
Transtibial (n=175)	23	20	43	20	16	36	-7
Transfemoral (n=57)	26	23	49	20	13	34	-15
Bilateral Transtibial (n=31)	21	18	39	18	12	31	-8

*** note there was only 1 TT/TF combination in 2016 and therefore unable to report**

5 Milestone Data

5.1 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
Number of days from final amputation to casting for prosthesis	*'days to casting'*
Number of days from casting to delivery of prosthesis where delivery is defined as the date at which the patient begins gait training with the prosthesis – finished or unfinished.	*'casting to delivery'*
Number of days from primary amputation to inpatient discharge (for patients having bilateral amputations and/or revision surgery see notes below)	*'days to inpatient discharge'* (length of stay)
Number of days from inpatient discharge to discharge from outpatient physiotherapy	'days inpatient discharge to outpatient discharge'

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 *days to inpatient discharge***
Transtibial Unilateral Fitted	Transtibial Unilateral Not Fitted
Transfemoral Unilateral Fitted	Transfemoral Unilateral Not Fitted
Bilateral* Fitted	Bilateral* Not Fitted

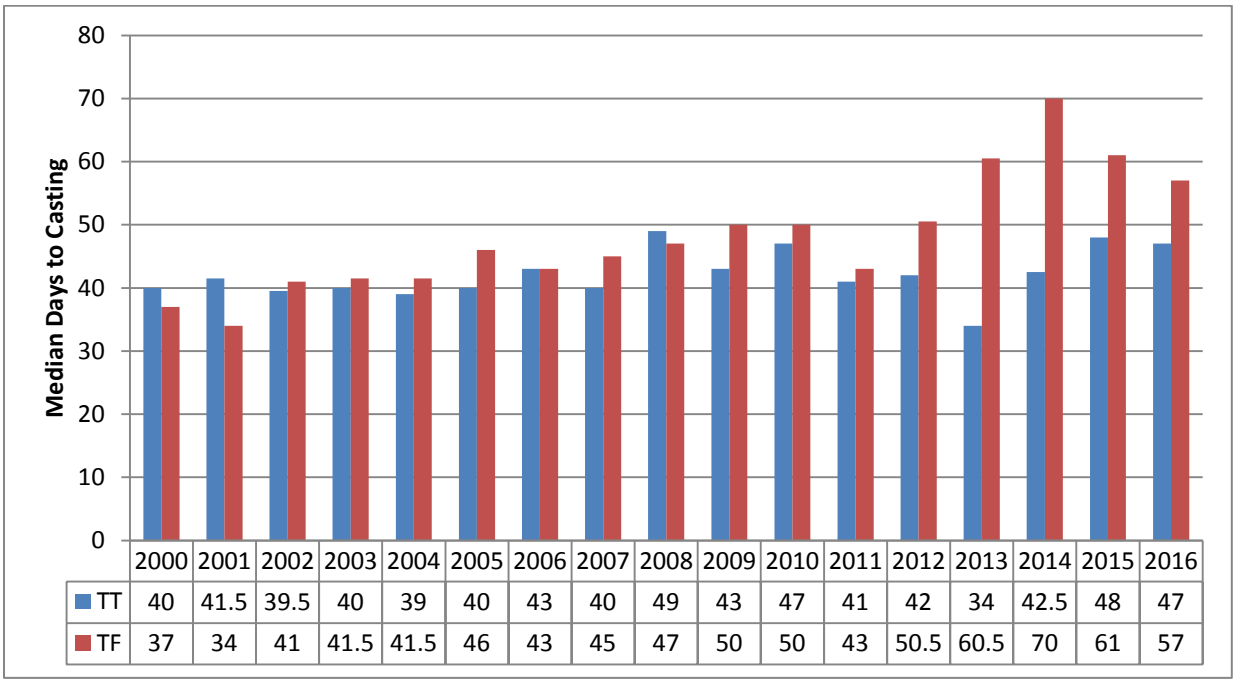
***Bilateral includes all those who underwent one amputation in the report period having had a prior amputation(s), and those who underwent bilateral amputations in the report period having had no prior amputations**

5.2 Days to Casting

Table 27 Days to casting milestone, descriptive statistics, 2016

	All Patients	Unilateral TTA	Unilateral TFA	Bilateral TTA	Bilateral TFA	TTA & TFA
Number Included	316	199	69	39	0	5
Lower Quartile	30	30	30	37	0	31
Upper Quartile	98	93	103	107	0	73
Median	53	47	57	55	0	60

Abbreviations: TFA=transfemoral, TTA=transtibial



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
TT	40	41.5	39.5	40	39	40	43	40	49	43	47	41	42	34	42.5	48	47
TF	37	34	41	41.5	41.5	46	43	45	47	50	50	43	50.5	60.5	70	61	57

Figure 2 Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2000-2016

5.3 *Casting to Delivery*

Table 28 Casting to delivery milestone, descriptive statistics, 2016

	All	Unilateral TTA	Unilateral TFA	Bilateral TTA	TTA & TFA
Number Included	308	199	68	36	7
Lower Quartile	7	7	8	7.5	7
Upper Quartile	16.5	17	20	14	21
Median	9	8	14	10	14

Abbreviations: TFA=transfemoral, TTA=transtibial

Table 29 Median casting to delivery milestone, 2002-2016

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
Transtibial	14	14	14	14	14	13	14	13	10	10	9	8	9	9	8
Transfemoral	15.5	14	14	14	15	14	15	15	15	14	14	13	15	14	14

5.4 Days to Inpatient Discharge: Fitted with a Prosthesis

Table 30 Days to inpatient discharge, patients fitted with a prosthesis, descriptive statistics, 2016

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	186	59	29
Lower Quartile	28	21	34
Upper Quartile	80	60	156.5
Median	49	41	67

Table 31 Median days to inpatient discharge, patients fitted with a prosthesis, 2002-2016 (Unilateral Only)

	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
TTA	61	53	55	54	56	55	55	55	59	50	51.5	47.5	41.5	43	49
TFA	71	69	55.5	63.5	57	58	67.5	53	59	33	49.5	37	35	48	41

Abbreviations: TFA=transfemoral, TTA=transtibial

5.5 Days to Inpatient Discharge: Not Fitted with a Prosthesis

Table 32 Days to inpatient discharge, patients not fitted with a prosthesis, descriptive statistics, 2016

	Unilateral TTA	Unilateral TFA	Bilateral TTA	Bilateral TFA	TTA & TFA
Number Included	58	146	22	31	28
Lower Quartile	30	30	22.5	12	17
Upper Quartile	89	75	102	90.5	80
Median	59.0	53.5	84	40	34

Table 33 Median days to inpatient discharge, patients not fitted with a prosthesis, 2002-2016 (Unilateral Only)

	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
TTA	50	37	52	51.5	66	60.5	62	61	45	53	64.5	45.5	42.5	40	59
TFA	48	41	42	47	52	46	47	51	41	34	36	32	34	43	53.5

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

Table 34 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 34 Days from inpatient discharge to outpatient discharge, limb-fitted amputees, 2016

	Unilateral TTA	Unilateral TFA	Bilateral TTA
Number Included	186	58	28
Lower Quartile	38.5	34	4
Upper Quartile	163	268	308
Median	91	126	76

***1 Patient was LF at the TTA and TFA level**

Table 35 Median Days from inpatient discharge to outpatient discharge, limb-fitted amputees 2011 - 2016

	2011	2012	2013	2014	2015	2016
Transtibial	89.5	92	96.5	111	99.5	91
Transfemoral	154	139	221	164.5	107	126
Bilateral	109	100	68	148.5	69	76

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

6.1 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.

6.2 Trends in Compression Therapy

Of the patients receiving compression therapy, the percentage who received it within 10 days of amputation is shown in Table 36 for 2001-2016. A line chart representing this data is shown in Figure 2

Table 36 Patients receiving compression therapy within 10 days of amputation (%), 2001– 2016

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
TTA	69.8	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	84.6
TFA	53.7	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	15.4

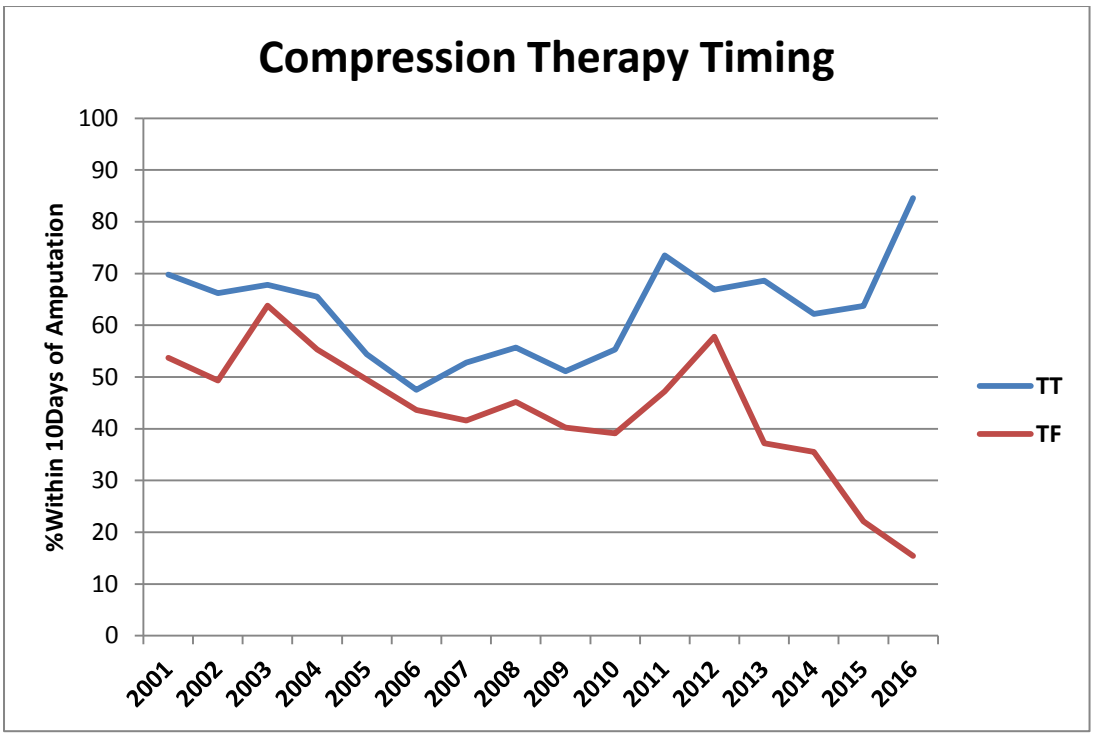


Figure 3 Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2001– 2016

6.3 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 37 for 2001-2016, categorised by level of amputation. A line chart representing this data is shown in Figure 3

Table 37 Patients using EWAs within 10 days of amputation (%), 2001– 2016

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
TTA	35.9	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
TFA	26.2	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

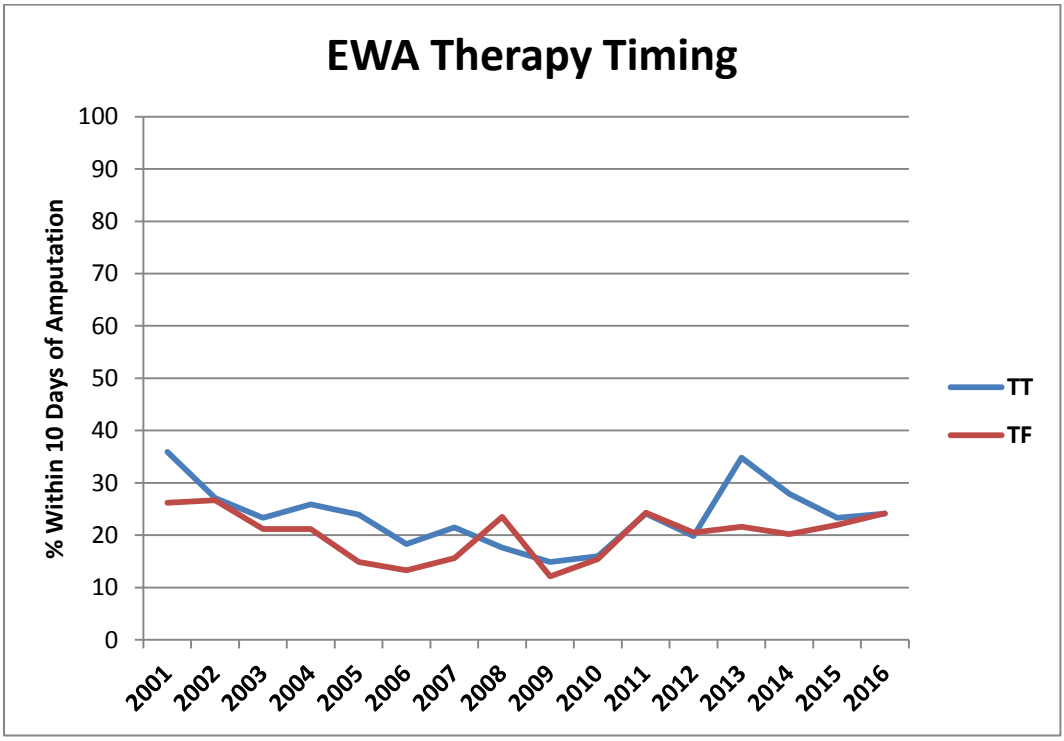


Figure 4 Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2001- 2016

7 Individual Hospital Summaries for 2016 – Key Performance Indicators

7.1 Data Checking Summary

This section presents the national data broken down by amputating hospital; please refer to Appendix H on Models of Care. Note that the recording of "cause of amputation" (section 3.2.2) was introduced in 2016 but was not a mandatory field however, as there were only 18 missing data sets; it was decided to report the findings. These data sets were not recorded as incomplete and so are not listed below.

The number of amputees at each hospital and the data completeness are shown in Table 38.

Table 38 Data Checking Summary by Hospital

Hospital	Total number (n=780)	Number of Missing Forms (n= 95)	Number Complete (n=681)	Number Incomplete (n=4)
Aberdeen Royal Infirmary	85	85	0	0
Ayr University Hospital	66	0	66	0
Dumfries & Galloway Royal Infirmary	18	0	18	0
Forth Valley Royal Infirmary	38	0	38	0
Glasgow Royal Infirmary	12	0	12	0
Hairmyres Hospital	97	0	97	0
Inverclyde Royal Hospital	**	0	**	0
Ninewells Hospital	105	0	104	**
Raigmore Hospital	46	**	44	**
Royal Alexandria Hospital	**	0	**	0
Royal Infirmary of Edinburgh	114	0	114	0
Queen Elizabeth University Hospital	152	**	149	**
St John's Hospital At Howden	**	0	**	0
Woodend hospital	8	8	0	0
Victoria Hospital (Kirkcaldy)	25	0	25	0
Outside Scottish Service	**	0	**	0

** = data n<6

7.2 Key Performance Indicators (Hospital)

7.2.1 Final Outcome

Final outcome (at discharge from physio) by hospital are shown in Table 39

Table 39 Key Performance Indicators by Hospital

Hospital	LF % (n)	NLF % (n)	Aban % (n)	Died % (n)	Total
Ayr University Hospital	45.5 (30)	31.8 (21)	**	16.7 (11)	66
Dumfries & Galloway Royal Infirmary	55.6 (10)	**	**	**	18
Forth Valley Royal Infirmary	39.5 (15)	42.1 (16)	**	15.8 (6)	38
Glasgow Royal Infirmary	50 (6)	**	**	**	12
Hairmyres Hospital	35.1 (34)	49.5 (48)	**	13.4 (13)	97
Inverclyde Royal Hospital	0	**	0	**	**
Ninewells Hospital	46.7 (49)	35.2 (37)	0	18.1 (19)	105
Queen Elizabeth University Hospital	38.4 (58)	45.7 (69)	5.3 (8)	10.6 (16)	151
Raigmore Hospital	40.9 (18)	40.9 (18)	**	13.6 (6)	44
Royal Alexandria Hospital	**	0	**	0	**
Royal Infirmary of Edinburgh	36 (41)	54.4 (62)	0	9.6 (11)	114
St John's Hospital, Livingstone	**	0	0	0	**
Victoria Hospital (Kirkcaldy)	44.4 (11)	36 (9)	**	**	25
Outside Scottish Service	**	**	0	0	**

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

** = data n<6

7.2.2 Age, FCI, Abandonment

Table 40 Median Age, and FCI for all; Limb Fitting of Females by Hospital

Hospital	Median Age (years)	Mean FCI	% Females LF (n)
Ayr University Hospital	71.0	3.48	20.0 (4)
Dumfries & Galloway Royal Infirmary	63.5	2.68	66.7 (4)
Forth Valley Royal Infirmary	67.5	3.29	37.5 (6)
Glasgow Royal Infirmary	38.0	0.62	50.0 (2)
Hairmyres Hospital	70.0	2.86	46.2 (12)
Inverclyde Royal Hospital	54.5	3.50	**
Ninewells Hospital	69.0	3.30	36.0 (9)
Queen Elizabeth University Hospital	64.0	2.95	32.6 (15)
Raigmore Hospital	71.0	2.91	25.0 (4)
Royal Alexandria Hospital	*	*	**
Royal Infirmary of Edinburgh	68.5	2.46	27.8 (10)
St John's Hospital , Livingstone	55.0	0.50	**
Victoria Hospital, Kirkcaldy	55.0	2.92	25.0 (2)
Outside Scottish Service	69.0	2.00	66.7 (2)
National	67.0	3.00	34.6 (72)

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

*** Unable to give median age or mean FCI as n<2**

**** no females had amputations at these hospitals in 2016**

7.2.3 Final Level of Amputation

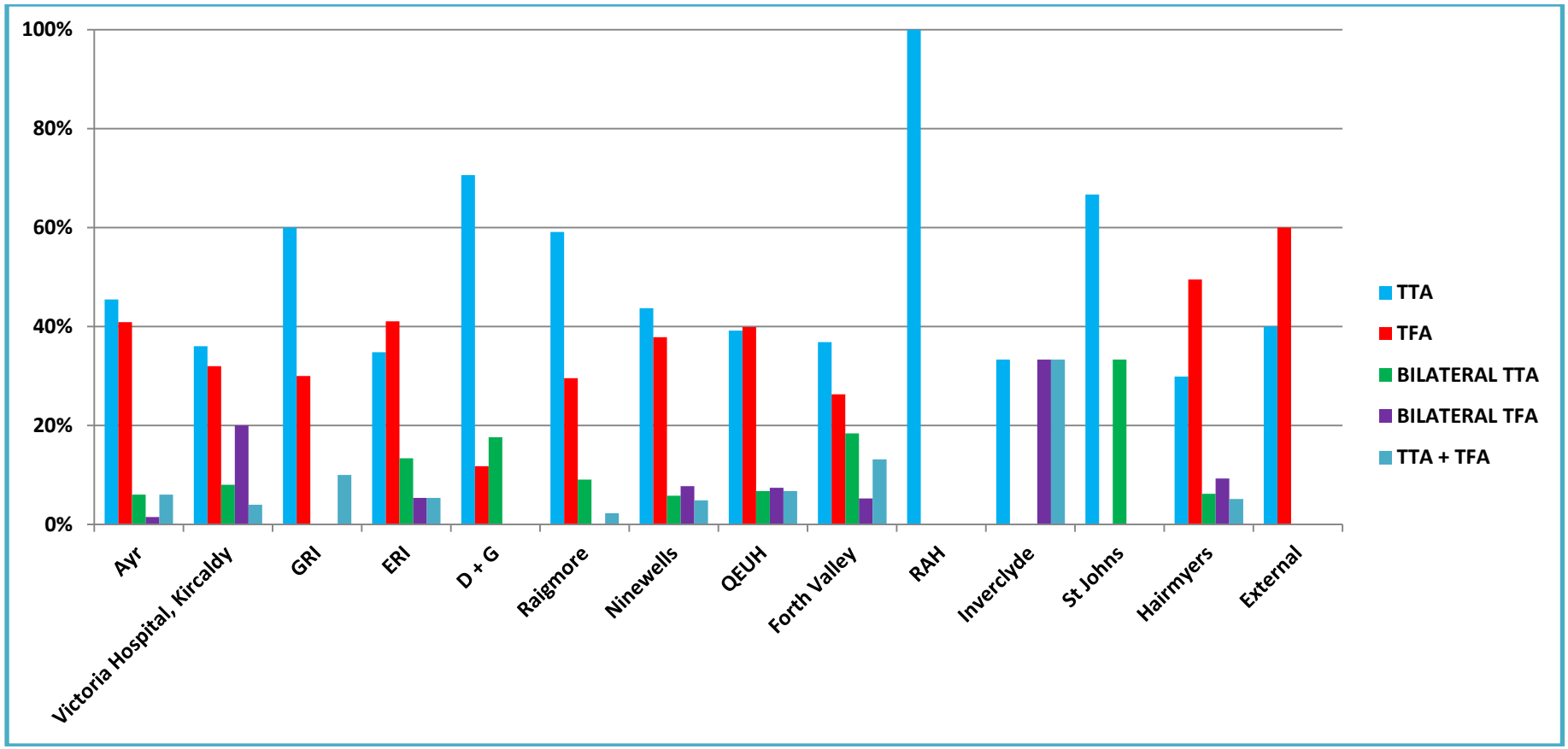
The final level of Amputation at the end of the rehabilitation period is recorded in Table 41.

Table 41 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)
Ayr University Hospital	45.5 (30)	40.9 (27)	0	**	**	**	0	66
Dumfries & Galloway Royal Infirmary	66.6 (12)	**	0	**	0	0	0	18
Forth Valley Royal Infirmary	36.8 (14)	26.3 (10)	0	18.4 (7)	**	**	0	38
Glasgow Royal Infirmary	50 (6)	**	**	0	0	**	0	12
Hairmyres Hospital	29.9 (29)	49.5 (48)	0	6.2 (6)	9.3 (9)	**	0	97
Inverclyde Royal Hospital	**	**	**	**	**	**	0	**
Ninewells Hospital	42.9 (45)	37.1 (39)	**	5.7 (6)	7.6 (8)	**	0	105
Queen Elizabeth University Hospital	34.8 (58)	39.1 (59)	**	6.6 (10)	7.3 (11)	6.6 (10)	**	151
Raigmore Hospital	57.8 (26)	28.9 (13)	**	**	0	**	0	45
Royal Alexandria Hospital	100 (2)	0	0	0	0	0	0	2
Royal Infirmary of Edinburgh	34.2 (39)	40.4 (46)	**	13.2 (15)	5.3 (6)	5.3 (6)	**	114
St John's Hospital, Livingstone	**	0	0	**	0	0	0	**
Victoria Hospital, Kirkcaldy	36 (9)	32 (8)	0	**	**	**	0	25
Outside Scottish Service	**	**	0	0	0	0	0	**
Total	**275**	**259**	**9**	**58**	**43**	**39**	**	**685**

Abbreviations: TFA=transfemoral, TTA=transtibial

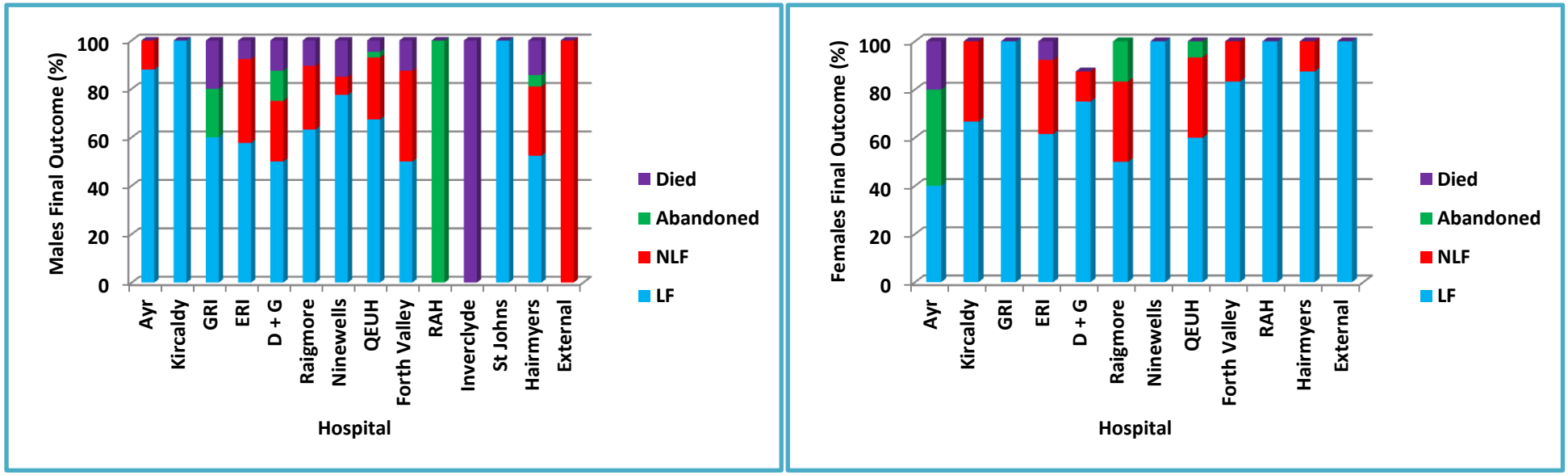
** = data n<6



Abbreviations: TFA=transfemoral, TTA=transtibial

Figure 5 Final Level of Amputation by Hospital

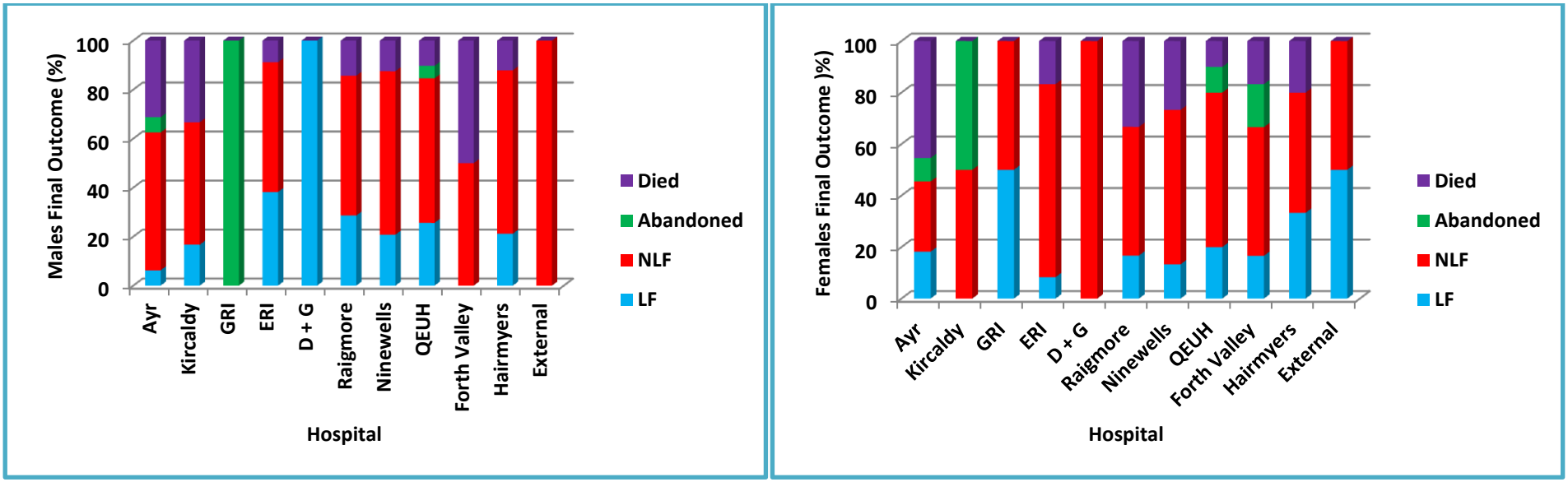
The final outcome denoted in the SPARG Discharge Summary Form (DSF) is depicted for those with a Unilateral TTA by Hospital in Figure 5



Abbreviations: TTA=transtibial, LF=Limb-fitted, NLF=Non Limb-fitted

Figure 6 Histograms of males and females with a unilateral TTA by final outcome and hospital

The final outcome denoted in the SPARG DSF is depicted for those with a Unilateral TFA by Hospital in Figure 6



Abbreviations: TFA=transfemoral, LF=Limb-fitted, NLF=Non Limb-fitted

Figure 7 Histograms of males and females with a unilateral TFA by final outcome and hospital

7.3 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 42.

Table 42 Key Performance Indicators (milestones) by hospital, 2016

Hospital	Days to CT	Days to EWA	Days to Casting	Days casting to delivery	In Patient Stay	Overall Length of Rehab
Ayr University Hospital (n=24)	14	22	80	14	21.5	200.5
Dumfries & Galloway Royal Infirmary (n=7)	7	10	35	9	34	136
Forth Valley Royal Infirmary (n=9)	76.5	128.5	151	9	76	243
Glasgow Royal Infirmary (n=4)	17	56.5	61	9	21	146.5
Hairmyres Hospital (n=18)	0	15	48	21	23	214.5
Ninewells Hospital (n=36)	0	11	32	7	53	108.5
Queen Elizabeth University Hospital (n=38)	8.5	11	35	9	45	179
Raigmore Hospital (n=15)	0	11.5	41	3	55	131
Royal Alexandria Hospital (n=2)	5.5	7.5	77	14	16	151
Royal Infirmary of Edinburgh (n=23)	13	17.5	47	7	80	105
St John's Hospital, Livingstone (n=2)	36.5	25	37	7	59	59
Victoria Hospital (Kirkcaldy) (n=8)	0	10	27	7	61.5	68.5
Outside Scottish Service* (n=1)						
National Median	**8**	**15**	**43**	**8**	**49**	**151**

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

***No data as Grampian not included in report.**

**Only 1 person therefore unable to give median*

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

8 Limb-fitting Centres

8.1 Hospital to Limb-fitting centre

Each of the five limb fitting centres receives referrals depending upon their geographical location. Table 43 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 43 Limb-fitting centres, referring hospitals and % limb-fitted, 2016

Limb-fitting Centres (LFC)	Referring hospital (n= number of amputees in 2016)	% Limb-fitted Unilateral TTA	% Limb-fitted Unilateral TFA
WestMARC (n=323) **(NHS GG&C**	Queen Elizabeth University Hospital (n= 152)	65.5	23.7
	Glasgow Royal Infirmary (n=12)	66.7	33.3
	Royal Alexandria Hospital (n=2)	50	n/a
	Inverclyde Royal Hospital (n=4)	100	n/a
	Hairmyres Hospital (n=97)	62.1	25
	Forth Valley Royal Hospital (n=38)	64.3	10
	Dumfries and Galloway Royal Infirmary (n=18)	58.3	66.7
Ayr (n=66) **WestMARC satellite clinic**	Ayr University Hospital (n=66)	80	11.1
SMART (n=117)	Royal Infirmary of Edinburgh (n=114)	59	30.4
	St John's Hospital, Livingstone (n=3)	100	n/a
TORT (n=130)	Ninewells Hospital (n=105)	80	17.9
	Victoria Hospital, Kirkcaldy (n=25)	88.9	12.5
Raigmore (n=46)	Raigmore Hospital (n=46)	57.7	23.1
MARS *			
Portsmouth (n= 53)	Queen Alexandra Hospital, Portsmouth	66.7	25

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

67.4% of all patients with a unilateral TTA and 22.6% of all patients with a unilateral TFA went onto be limb-fitted. This figure shows the breakdown of where these patients were limb-fitted by centre.

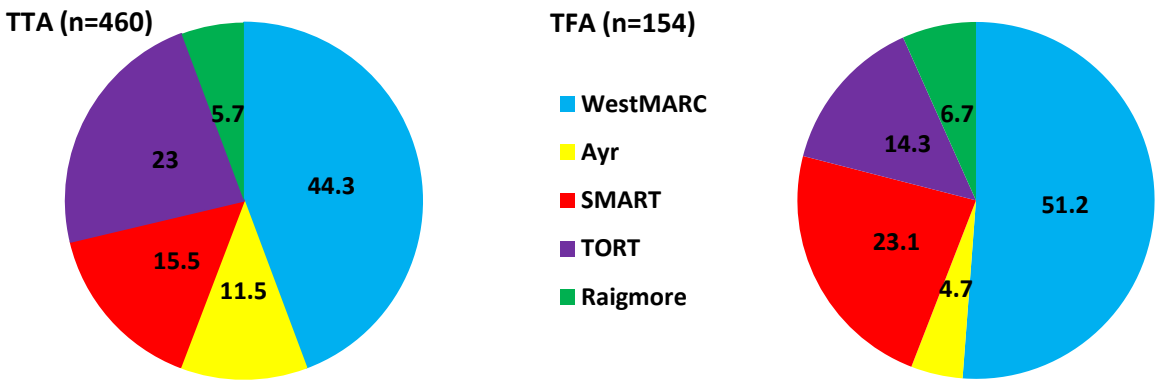


Figure 8 Percentage of unilateral TTA and TFA limb-fitted by limb-fitting centre

8.2 Milestones by Limb-fitting centre

The number of, and milestones data for limb-fitted unilateral transtibial amputees are presented for each hospital in Table 44.

Table 44 Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre, 2016

Limb-fitting Centre	Days to CT	Days to EWA	Days to Casting	Days casting to delivery	In Patient LOS	Overall Length of Rehab
WestMARC (NHS GG&C) (n=77)	8	14.5	43	10	40	184
Ayr (satellite clinic of WestMARC) (n=24)	14	22	80	14	21.5	200.5
SMART (NHS Lothian)(n=25)	13	18.5	43	7	75	93
TORT (NHS Tayside) (n=44)	0	11	31	7	53.5	95.5
Raigmore (NHS Highland)(n=15)	0	11.5	41	3	55	131
MARS*(NHS Grampian)						
National Median	8	15	43	8	49	151
Portsmouth Enablement Centre (n= 53)	12	46	74.5	15	20	207

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

9 References

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The 'MUST' Explanatory Booklet: A guide to the 'Malnutrition Universal Screening Tool' ('MUST'), Produced by Malnutrition Advisory Group, A standing committee of BAPEN, http://www.bapen.org.uk/pdfs/must/must_explan.pdf

10 Appendices

10.1 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).

10.2 Appendix B List of SPARG Database reporting facilities

30 days mortality
Amputees fitted with a prosthesis and abandoned - by level (bilateral)
Amputees fitted with a prosthesis and abandoned - by level (unilateral only)
Amputees fitted with prosthesis for transfers only (bilateral)
Amputees fitted with prosthesis for transfers only (unilateral only)
Bilateral amputation surgery - by level
Check final outcome
Check important dates
Cognitive status - by aetiology
Cognitive status - by level
Compression therapy - by type
Days from casting to delivery
Days from final surgery to casting
Days from final surgery to compression therapy - by aetiology
Days from final surgery to compression therapy - by level (bilateral)
Days from final surgery to compression therapy - by level (unilateral only)
Days from final surgery to EWA - by aetiology
Days from final surgery to EWA - by level (bilateral)
Days from final surgery to EWA - by level (unilateral only)
Days from in-patient discharge to out-patient discharge - by aetiology
Days from in-patient discharge to out-patient discharge - by level (bilateral)
Days from in-patient discharge to out-patient discharge - by level (unilateral only)
Delayed healing - by aetiology
Delayed healing - by level (bilateral)
Delayed healing - by level (unilateral only)
Delayed in-patient discharge
EWAs - by type
Falls
Final outcome summary
Final outcome summary - by aetiology
Final outcome summary - by level (bilateral)
Final outcome summary - by level (unilateral only)
Functional co-morbidities index - by aetiology

Functional co-morbidities index - by level (bilateral)

Functional co-morbidities index - by level (unilateral only)

Gender and mean age

Gender and mean age - by aetiology

Gender and mean age - by level (bilateral)

Gender and mean age - by level (unilateral only)

Healthcare acquired infection (other)

Heamodialysis

Home circumstances

Interim discharge

Length of stay (days from final surgery to in-patient discharge) - Limb-fitted amputees by aetiology

Length of Stay (days from final surgery to in-patient discharge) - Limb-fitted amputees by level

Length of stay (days from final surgery to in-patient discharge) - non Limb-fitted amputees by aetiology

Length of Stay (days from final surgery to in-patient discharge) - non Limb-fitted amputees by level

Limb fitting - timing

Locomotor capabilities index 5 - by aetiology

Locomotor capabilities index 5 - by level

Overall summary - by aetiology

Overall summary - by level (bilateral)

Overall summary - by level (unilateral only)

Revisions and re-amputations in same episode

Wound infection - by aetiology

Wound infection - by level (bilateral)

10.3 Appendix C Aetiology Mapping

Definition

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

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

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

Mapping

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

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

10.4 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**
Basic Activities		
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		
Advanced activities		
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		

10.5 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/m^2 i.e. patient is likely to be obese.

Functional Co-morbidities Index

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

10.6 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"

10.7 Appendix G Models of Care Summary for all major amputating centres in Scotland (n ≥ 10)

QUEEN ELIZABETH UNIVERSITY HOSPITAL (WESTERN INFRIMARY until May 2015), NHS GREATER GLASGOW & CLYDE: Vascular Unit

Following an amputation, patients at WI/QEUH will receive treatment from a specialist physiotherapist. 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, Monday to Friday, with an average treatment session lasting 90-120 minutes. 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. At QEUH, there is an on-site prosthetic centre (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.

Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge.

QUEEN ELIZABETH UNIVERSITY HOSPITAL (SOUTHERN GENERAL HOSPITAL to May 2015), NHS GREATER GLASGOW & CLYDE: **Orthopaedic Unit**

Following an amputation, patients at QUEH/SGH(Ortho) will receive treatment from orthopaedic physiotherapist (whilst on Ward) and specialist amputee physiotherapist 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, with an average total treatment time of 180 minutes. Patients who are appropriate for prosthetic input will routinely be discharged after their first casting. At QEUH/SGH, there is an onsite prosthetic centre; WestMARC.

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 twice a week.

Patients, who are not appropriate for prosthetics, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge.

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. Patients will routinely receive one treatment session daily, Monday to Friday, 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 twice a week.

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.

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, 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.

Patients who are not appropriate for prosthetics will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge.

INVERCLYDE ROYAL HOSPITAL, NHS GREATER GLASGOW & CLYDE

Following an amputation, patients at IRH will receive treatment from a specialist physiotherapist. Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is routinely used post-operatively, usually for 14 days with a wound review at 7 days. Multi-disciplinary team working is complemented by regular MDT meetings. 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 gym. Patients proceeding with prosthetic fitting will routinely receive one treatment session daily, Monday to Friday, with an average treatment session lasting 30 minutes. Patients who are not prosthetic candidates will receive physiotherapy input three days a week.

Patients who are appropriate for prosthetic input will routinely be discharged after their first casting. At IRH, 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 their acute hospital. 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, but will only access physiotherapy on discharge as required. This will be provided via a domiciliary service

This service may be changing in 2017 with all patients being amputated at QUEH.

HAIRMYRES HOSPITAL, NHS LANARKSHIRE

Following an amputation, patients at Hairmyres Hospital will receive treatment from a specialist physiotherapist. Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is routinely used post-operatively, 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, with an average treatment session lasting 45 minutes. 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 out-patient physiotherapy follow-up at their nearest acute hospital. 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, but will only access physiotherapy on discharge as required. This will be provided via a domiciliary service.

ROYAL INFIMARY 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. At AAH they will receive treatment from a specialist physiotherapist. 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 in-patient at 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, with an average total daily treatment time lasting 100 minutes.

At AAH there is an on-site prosthetic centre; SMART Centre. Patients will routinely be discharged after prosthetic fitting. If outpatient physiotherapy is required this will be arranged accordingly. 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.

NINEWELLS HOSPITAL, NHS TAYSIDE

Following an amputation, patients at Ninewells Hospital will receive treatment from a specialist physiotherapist. 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 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 sessions daily, Monday to Friday, increasing to two per day if for prosthetic fitting with an average total daily treatment time of 120 minutes. Patients will routinely be discharged after prosthetic fitting. At Ninewells, there is an on-site prosthetic service - 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 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.

FORTH VALLEY ROYAL HOSPITAL, NHS FORTH VALLEY

Following an amputation, patients at FVRH will receive treatment from a specialist physiotherapist. 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. 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, 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.

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 the SMART Centre, Astley Ainslie Hospital. 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 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.

RAIGMORE HOSPITAL, NHS HIGHLAND

Following an amputation, patients at Raigmore Hospital will receive treatment from a specialist physiotherapist. Rehabilitation will occur in their amputating bed. A post-operative rigid dressing is routinely used, 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, Monday to Friday, with an average treatment session lasting 60 minutes. Patients who are appropriate for prosthetic-review will routinely be discharged after prosthetic fitting. At Raigmore, there is an on-site prosthetic centre.

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.

VICTORIA HOSPITAL, KIRCALDY, NHS FIFE

Following an amputation, patients at VHK will receive treatment from a specialist physiotherapist. 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, 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, Monday to Friday, with an average treatment session lasting 60 minutes. Patients who are appropriate for prosthetics review will routinely be transferred, as an in-patient, to Ninewells Hospital where there is on-site prosthetic input. In-patient rehab will continue at Ninewells until prosthetic-fitting. They will then follow the rehab pathway used at Ninewells.

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.

AYR HOSPITAL, NHS AYSHIRE & ARRAN

Following an amputation on the vascular ward, patients at Ayr Hospital will receive treatment from a specialist physiotherapist. 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, Monday to Friday, with average treatment time lasting 60 minutes. 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.

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 twice a week.

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.

DUMFRIES & GALLOWAY ROYAL INFIRMARY, NHS DUMFRIES & GALLOWAY

Following an amputation, patients at DGRI Hospital will receive treatment from a non-specialist physiotherapist. 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 non-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, with an average treatment session lasting 60 minutes. There is no specific protocol/pathway for time of discharge in patients' hospital stay i.e. pre-cast, post-cast, after limb-fitting. 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 non-specialist physiotherapist more than once a week.

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.

ABERDEEN ROYAL INFIRMARY, NHS GRAMPIAN

Following an amputation, patients at ARI will receive treatment from a specialist physiotherapist. 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. These are not attended by a discharge co-ordinator.

As an in-patient appropriate for prosthetic input, physiotherapy will take the form of gym based sessions in both 1:1 and group sessions. Patients will routinely receive one treatment session four days a week, with an average treatment session lasting 45 minutes. Patients who are appropriate for prosthetic input will routinely be discharged after prosthetic fitting. At ARI, there is no on-site prosthetic centre and subsequently they will be referred to their nearest site which is M.A.R.S, Woodend Hospital.

Prosthetic candidates will have access to physiotherapy after discharge as required. The level of input is dependent on geography and ongoing rehab 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 who are not appropriate for prosthetics will receive their physiotherapy in the form of both gym based and ward sessions. These will in both 1:1 and group settings. Patients will routinely receive

one treatment session 2-3 days a week, with an average treatment session lasting 30 minutes. Access to physiotherapy on discharge will be provided as required – at ARI they will see a non-specialist physiotherapist via a domiciliary service.

QUEEN ALEXANDRA HOSPITAL, PORTSMOUTH HOPSITALS 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, 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 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 prosthetics will receive the same level of in-patient input but would access community rehabilitation, if required, on discharge.

10.8 Appendix H Multidisciplinary Advisory Group

Helen Scott, Team Lead Physiotheraist 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

Wesley Stuart, Consultant Vascular surgeon, QEUH, Glasgow

Francine McCafferty, Prosthetist, SMART Centre, Edinburgh

Lynn Hutton, Rehabilitation Consultant, SMART Centre, Edinburgh

Marjory Robertson, Specialist OT, Westmarc, Glasgow