# A Survey of the Lower Limb Amputee Population in Scotland 2022 and 2023 Public Report

**SPARG**
Scottish Physiotherapy Amputee Research Group

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**Authors**

Miss R Carr, SPARG Data Officer

Mrs J Hebenton, SPARG Chairman

Dr F Davie-Smith, SPARG Research Officer

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

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

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## Tables and Figures

# 1 Acknowledgements

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SPARG would also like to thank the British Association of Chartered Physiotherapists in limb Absence Rehabilitation (BACPAR) for providing the funding to allow us to produce this report.

# 2 SPARG 2022 & 2023 Annual Report: Executive Summary

- The number of amputations in Scotland significantly increased in 2023 (914). The number of hip disarticulations in this year was also notably high (14).
- The population of those with a major lower limb amputation (MLLA) in Scotland continue to have a median age of 66 years and 71% are male. The ratio of transtibial (TTA) to transfemoral (TFA) amputations is 1.5:1, this is largely unchanged.
- The prevalence of diabetes in this cohort has started to stabilise since 2020 at around 55%.
- Dysvascular aetiology remains the leading cause of amputation in Scotland.
- The number of patients limb-fitted overall remains constant at 40%–45%. The main difference in numbers of patients limb-fitted is between TTA and TFA level of amputation.
- In 2022, 65% of those with TTA and 15% of those with TFA were limb-fitted.
- In 2023, 66% of those with a TTA and 19% of those with a TFA were limb-fitted. Although there was an increase in TFA patients limb-fitted in 2021 (27%), this has reduced again to below 20% through 2022-23 and seems to be the new normal.
- In 2023, TORT limb-fitted the lowest percentage of TFAs since SPARG reports began (7%). During COVID-19, TORT lost their in-patient rehabilitation beds and set up an outreach service within patients' homes. This has continued since COVID-19 and is thought to be a positive change. It will be interesting to monitor whether this lower rate of limb-fitting for TFA patients continues, and if the outreach service has enabled more targeted limb-fitting decision making.
- The median days from casting to delivery for TFA patients increased from 9 to 14 days in 2022, and remained at this in 2023.
- The median days from casting to delivery for TTA patients increased from 7 to 14 days in 2023.
- The median days to in-patient discharge when limb-fitted, increased slightly in 2022-23 but remained lower than the pre-COVID-19 length of stay.

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

# 3 Introduction

This is the 30th Annual Report on data collated from all major lower limb amputations (MLLA) in Scotland by the Scottish Physiotherapy Amputee Research Group (SPARG). This is the second time SPARG has produced a report combining two years of data. All MLLAs carried out in 2022 and 2023 are included: ankle disarticulation (AD); transtibial (TTA); knee disarticulation (KDA); transfemoral (TFA); hip disarticulation (HD) and transpelvic (TP). Patients having partial amputations of the feet and amputation of the toes are excluded. All 2022 data was entered locally onto the SPARG web-based database as per previous years. 2023 was the first year that an excel spreadsheet was used for data collection. Seven spreadsheets, with access limited to the relevant Physiotherapists, were created to enable local inputting (Aberdeen, Ayrshire, Dundee, Edinburgh, Glasgow, Hairmyres & Inverness). At the end of the data collection period a master spreadsheet was created, accumulating all seven spreadsheets allowing for data checking and analysis.

National and individual hospital data are presented in this report. All outcomes are reported according to final level of MLLA. Individual hospital data are summarised to facilitate comparison of outcomes and the benchmarking of services. The comparative data items or key performance indicators (KPIs) for each hospital were identified by a previous, multidisciplinary benchmarking exercise[3]. Each of the larger centres' ($n \geq 10$) model of care (MOC) has been described according to criteria identified in the benchmarking report and agreed following consultation with SPARG members. Each MOC has been scored according to a system described in a study into the impact pathways have on rehabilitation milestones and outcomes after amputation [1].

There were 7 forms missing in 2022 and a further 4 had a significant amount of information missing but were included as the basic demographic and amputation details were available. There were 3 forms missing for 2023 and a further 6 had significant amount of information missing but were included as the basic demographic and amputation details were available.

Unfortunately, due to data governance restrictions for an eighth 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.

The quality management "data checking" system introduced in 2003 continues to be successful with 99.3% completion.

# 4 Results: Demographic Profiles

## 4.1 Introduction

National survey data are presented in this section. Where possible, comparisons are shown for 2019-2023. The total number of amputees for 2022 and 2023 were 798 and 914 respectively; included in the analysis are 704 data sets from 2022 and 802 from 2023. Missing data includes all data sets from Grampian Health Board for both years (n= 87 in 2022 and n=110 in 2023) and those forms not returned for data input (n=7 in 2022 n=2 in 2023). In 2022, 704 patients underwent 728 amputation procedures and in 2023, 802 patients underwent 836 amputation procedures; some patients having had bilateral amputations during the same episode of care.

## 4.2 Amputee Details

### 4.2.1 Age and Sex Distribution

The report contains data from 704 amputees in 2022 and 802 in 2023.The data for numbers of amputees from 2019-2023 by age and sex is shown in Table 1.

**Table 1 Age and sex of amputee population, 2019- 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **No. of Amputees** | 766 | 752 | 776 | 798 | 914 |
| **No. of Amputee with Data** | 691 | 677 | 673 | 704 | 802 |
| **Males %** | 71.5% | 70.8% | 69.8% | 73.6% | 70.8% |
| **Females %** | 28.5% | 29.2% | 30.2% | 26.4% | 29.2% |
| **Age Median (years)** | 67 | 67 | 66 | 67 | 66 |
| **Age Upper Quartile (years)** | 76 | 76 | 74 | 74 | 75 |
| **Age Lower Quartile (years)** | 58 | 59 | 58 | 58 | 57 |

### 4.2.2 Immediate cause of amputation

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

**Table 2 Cause of amputation recorded by level and by aetiology: 2022 and 2023**

| **Cause of amputation 2022** | **Ischaemia** | | **Infection** | **Combination *** | **N/A**** |
|---|---|---|---|---|---|
| | n=392 (54%) | | n=175 (24%) | n=118 (16%) | n=43 (6%) |
| **Level n= 728** (0 missing) | TT | 228 | 133 | 76 | 22 |
| | TF | 164 | 39 | 42 | 17 |
| | TP | 0 | 0 | 0 | 1 |
| | HD | 0 | 1 | 0 | 1 |
| | KD | 0 | 2 | 0 | 1 |
| | AD | 0 | 0 | 0 | 0 |
| **Aetiology n= 728** (0 missing) | PAD without diabetes | 189 (48%) | 20 (11%) | 23 (19.5%) | 0 (0%) |
| | Diabetes | 183 (47%) | 127 (73%) | 84 (71%) | 1 (2%) |
| **Cause of amputation 2023** | **Ischaemia** | | **Infection** | **Combination *** | **N/A**** |
| | n=438 (52%) | | n=232 (28%) | n=117 (14%) | n=49 (6%) |
| **Level n= 836** (0 missing) | TT | 230 | 166 | 79 | 21 |
| | TF | 205 | 59 | 37 | 18 |
| | TP | 0 | 0 | 0 | 3 |
| | HD | 1 | 7 | 1 | 5 |
| | KD | 2 | 0 | 0 | 2 |
| | AD | 0 | 0 | 0 | 0 |
| **Aetiology n= 836** (0 missing) | PAD without diabetes | 193 (44%) | 24 (10%) | 26 (22%) | 0 (0%) |
| | Diabetes | 213 (49%) | 163 (70%) | 87 (74%) | 0 (0%) |

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

**Table 3 Cause of amputation 2019 – 2023 for all levels**

| **Cause of amputation** | **Ischaemia** | **Infection** | **Combination*** | **N/A**** |
|---|---|---|---|---|
| **2019** | 55% | 23% | 16% | 5% |
| **2020** | 58% | 23% | 14% | 5% |
| **2021** | 54% | 28% | 13.5% | 4.5% |
| **2022** | 54% | 24% | 16% | 6% |
| **2023** | 52% | 28% | 14% | 6% |

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

### 4.2.3 PAD and Diabetes

The following table summarises the age and sex of persons with MLLA with aetiology of diabetes, and PAD without diabetes, 2019 - 2023.

**Table 4 PAD and Diabetes, age and sex, 2019 – 2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Diabetes | PAD without diabetes | Diabetes | PAD without diabetes | Diabetes | PAD without diabetes | Diabetes | PAD without diabetes | Diabetes | PAD without diabetes |
| **Number of Amputees** | 385 | 227 | 389 | 237 | 386 | 210 | 388 | 219 | 448 | 232 |
| **Number with age available** | 371 | 211 | 373 | 227 | 376 | 209 | 388 | 219 | 448 | 232 |
| **Age Median** | 67 | 71 | 68 | 71 | 66 | 70 | 66 | 70 | 70 | 70 |
| **Age Upper Quartile** | 75 | 77 | 75 | 78 | 74 | 77 | 73 | 78 | 74 | 78 |
| **Age Lower Quartile** | 58 | 62 | 60 | 63 | 58 | 62 | 59 | 63 | 59 | 62 |
| **N Male** | 283 | 141 | 287 | 150 | 269 | 140 | 307 | 150 | 338 | 158 |
| **N Female** | 88 | 70 | 86 | 77 | 107 | 61 | 81 | 69 | 110 | 74 |
| **Males %** | 76.3% | 66.8% | 76.9% | 66.1% | 71.5% | 69.7% | 79% | 68.5% | 75.4% | 68.1% |
| **Females %** | 23.7% | 33.2% | 23.1% | 33.9% | 28.5% | 30.3% | 21% | 31.5% | 24.6% | 31.9% |

### 4.2.4 Aetiology of Amputation

The incidence of each aetiology recorded is shown in Table 5. Peripheral arterial disease (with and without diabetes) accounted for 84.5% of all amputations in 2023. Orthopaedic aetiology was not sub-categorised in 2023.

**Table 5 Aetiology of amputation, 2019 – 2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **PAD without diabetes** | 227 | 31% | 237 | 33.4% | 210 | 30.1% | 232 | 31.9% | 243 | 29.1% |
| **Diabetes** | 385 | 52.5% | 389 | 54.9% | 386 | 55.3% | 395 | 54.3% | 463 | 55.4% |
| **Trauma or Burns** | 23 | 3.1% | 13 | 1.8% | 18 | 2.6% | 21 | 2.9% | 24 | 2.9% |
| **Tumour** | 7 | 1% | 11 | 1.6% | 12 | 1.7% | 14 | 1.9% | 14 | 1.7% |
| **Congenital deformity** | 1 | 0.1% | 0 | 0% | 0 | 0% | 3 | 0.4% | 1 | 0.1% |
| **Drug abuse** | 9 | 1.2% | 7 | 1% | 13 | 1.9% | 24 | 3.3% | 18 | 2.2% |
| **Venous disease** | 8 | 1.1% | 10 | 1.4% | 17 | 2.4% | 9 | 1.2% | 2 | 0.2% |
| **Orthopaedic (total)*** ** | 25 | 3.4% | 14 | 2% | 13 | 1.8% | 10 | 1.4% | 36 | 4.3% |
| **Orthopaedic – non union** | 15 | 2% | 9 | 1.3% | 10 | 1.4% | 3 | 0.4% | ** | ** |
| **Orthopaedic failed joint** | 2 | 0.3% | 0 | 0% | 2 | 0.3% | 5 | 0.7% | ** | ** |
| **Orthopaedic acquired deformity** | 3 | 0.4% | 1 | 0.1% | 1 | 0.1% | 2 | 0.3% | ** | ** |
| **Blood-borne infection** | 18 | 2.5% | 16 | 2.3% | 9 | 1.3% | 7 | 1% | 15 | 1.8% |
| **Renal Failure** | 5 | 0.7% | 2 | 0.3% | 1 | 0.1% | 1 | 0.1% | 2 | 0.2% |
| **CRPS *** | 12 | 1.6% | 5 | 0.7% | 10 | 1.4% | 5 | 0.7% | 2 | 0.2% |
| **Acute Vascular Injury** | 8 | 1.1% | 5 | 0.7% | 9 | 1.3% | 7 | 1% | 16 | 1.9% |
| **Not recorded** | 5 | 0.7% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| **Total** | 733 | 100% | 709 | 100% | 698 | 100% | 728 | 100% | 836 | 100% |

* Chronic Regional Pain Syndrome (CRPS)

** Changes to the data collection process meant that orthopaedic aetiologies were not split into subcategories; this issue will be addressed from 2024 onwards.

### 4.2.5 Initial Level of Amputation

Table 6 shows the incidence of six levels of MLLA for the years 2019-2023. For those who had bilateral MLLA in the reported period, both MLLAs are included in the data. The number of levels recorded will therefore be greater than the number of patients for any given year. The level indicates the initial level of MLLA. There was one rotationplasty in 2022.

**Table 6 Amputation Level, 2019-2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Transtibial** | 440 | 60% | 403 | 56.8% | 407 | 58.3% | 459 | 63% | 496 | 59.3% |
| **Transfemoral** | 277 | 37.8% | 293 | 41.3% | 286 | 41% | 262 | 36% | 319 | 38.2% |
| **Trans pelvic** | 2 | 0.3% | 3 | 0.4% | 0 | 0% | 2 | 0.3% | 3 | 0.4% |
| **Hip Disarticulation** | 4 | 0.5% | 2 | 0.3% | 3 | 0.4% | 2 | 0.3% | 14 | 1.7% |
| **Knee Disarticulation** | 7 | 1% | 8 | 1.1% | 2 | 0.3% | 3 | 0.4% | 4 | 0.5% |
| **Ankle Disarticulation** | 3 | 0.4% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| **Other** | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| **Not recorded** | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| **Total** | **733** | **100%** | **709** | **100%** | **698** | **100%** | **728** | **100%** | **836** | **100%** |

### 4.2.6 Patients Fitted with a Prosthesis

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

**Table 7 Patients fitted with a prosthesis 2019– 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Total Number (n=)** | 691 | 677 | 673 | 703 | 800 |
| **Number fitted (n=)** | 284 | 264 | 304 | 297 | 339 |
| **Percentage fitted (%)** | 41.3% | 39% | 45.2% | 42.2% | 42.4% |

**Table 8 Proportion of patients with unilateral amputation successfully fitted with a prosthesis by level 2019 – 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **TTA (%)** | 65.4% | 63.1% | 69.2% | 65.1% | 66.2% |
| **TFA (%)** | 18.1% | 16.9% | 27.3% | 15.4% | 19.1% |
| **Other (%)** | 33.3% | 18.1% | 33.3% | 44.4% | 14.3% |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 9 Proportion of patients with bilateral amputations successfully limb-fitted, bilateral 2019 – 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Bilateral – all levels %** | 21.9% | 29.2% | 22.7% | 30.9% | 34.4% |

**Table 10 Bilateral patients limb-fitted by level 2022 and 2023**

| | Bilateral TTA | | Bilateral TFA | | TTA & TFA | |
|---|---|---|---|---|---|---|
| | **2022** (n=54) | **2023** (n=64) | **2022** (n=35) | **2023** (n=42) | **2022** (n=36) | **2023** (n=24) |
| **Limb-fitted n (%)** | 34 (63%) | 41 (64%) | 0 (0%) | 0 (0%) | 4 (11%) | 4 (17%) |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 11 Sex and limb-fitting outcome, by level, 2019– 2023**

| **Unilateral TTA** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|
| Total Males (n) | 254 | 226 | 227 | 261 | 267 |
| Total Females (n) | 68 | 67 | 72 | 74 | 90 |
| Males Limb-fitted (n) | 178 | 152 | 161 | 167 | 177 |
| Females Limb-fitted (n) | 32 | 33 | 46 | 51 | 58 |
| % Limb-fitted - Male | 70.1% | 67.3% | 70.9% | 64% | 66.3% |
| % Limb-fitted - Female | 47.1% | 49.3% | 63.9% | 68.9% | 64.4% |
| **Unilateral TFA** | **2019** | **2020** | **2021** | **2022** | **2023** |
| Total Males (n) | 127 | 162 | 155 | 154 | 185 |
| Total Females (n) | 84 | 98 | 94 | 80 | 108 |
| Males Limb-fitted (n) | 24 | 34 | 45 | 26 | 42 |
| Females Limb-fitted (n) | 14 | 10 | 23 | 10 | 14 |
| % Limb-fitted - Male | 18.9% | 20.9% | 29% | 16.9% | 22.7% |
| % Limb-fitted - Female | 16.7% | 10.2% | 24.5% | 12.5% | 13% |
| **Bilateral** | **2019** | **2020** | **2021** | **2022** | **2023** |
| Total Males (n) | 104 | 87 | 85 | 96 | 101 |
| Total Females (n) | 42 | 26 | 34 | 30 | 30 |
| Males Limb-fitted (n) | 25 | 30 | 21 | 35 | 37 |
| Females Limb-fitted (n) | 7 | 3 | 6 | 4 | 8 |
| % Limb-fitted - Male | 24% | 34.5% | 24.7% | 36.5% | 36.6% |
| % Limb-fitted - Female | 16.7% | 11.5% | 17.6% | 13.3% | 26.7% |

Abbreviations: TTA=transtibial, TFA=transfemoral

### 4.2.7 Prosthetic Rehabilitation Abandoned

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

**Table 12 Prosthetic rehabilitation abandoned as a proportion of those limb-fitted, 2019–2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **All amputees** | 3.9 | 27% | 2.5 | 17% | 2.2 | 15% | 6 | 41% | 3.6 | 29% |
| **Unilateral TTA** | 4.3 | 14% | 3.1 | 9% | 3 | 9% | 6 | 21% | 2 | 7% |
| **Unilateral TFA** | 4.8 | 10% | 2.7 | 7% | 1.2 | 3% | 7 | 17% | 3.8 | 11% |
| **Other** | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% | 4.8 | 1% |
| **Bilateral** | 2.1 | 3% | 0.9 | 1% | 2.5 | 3% | 2 | 3% | 0 | 0% |

Abbreviations: TFA=transfemoral, TTA=transtibial

### 4.2.8 Mortality

Table 13 shows the proportion of patients who died within 30 days of their initial amputation, 2019 – 2023.

**Table 13 Mortality 2019 - 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Number of amputees** | 691 | 677 | 673 | 704 | 802 |
| **30-day Mortality (n)** | 34 | 37 | 41 | 42 | 43 |
| **30-day Mortality (%)** | 4.9% | 5.5% | 6.1% | 6% | 5.4% |

### 4.2.9 Final Outcome Summary

Table 14 gives a summary of gross outcomes for all amputees at the time of final discharge from physiotherapy whether at in-patient discharge or after a period of out-patient treatment from 2019–2023. Non limb-fitted now includes those who abandoned prosthetic use as that was their final outcome. Table 15 shows final outcome by aetiology and including those abandoned prosthetic rehabilitation, for 2022 and 2023.

**Table 14 Final outcome summary, 2019 - 2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **n** | **%** | **n** | % | **n** | **%** | **n** | **%** | **n** | **%** |
| **Limb-fitted** | 284 | 41.1% | 264 | 39% | 304 | 45.2% | 297 | 42.2% | 339 | 42.3% |
| **Not Limb-fitted** | 308 | 44.6% | 329 | 48.6% | 286 | 42.5% | 301 | 42.8% | 332 | 41.4% |
| **Deceased** | 96 | 13.9% | 84 | 12.4% | 83 | 12.3% | 105 | 14.9% | 110 | 13.7% |
| **Unknown** | 1 | 0.4% | 0 | 0% | 0 | 0% | 1 | 0.1% | 2 | 0.2% |

**Table 15 Final outcome by aetiology for 2022 and 2023**

| | Limb-fitted n (%) | | Non-limb-fitted n (%) | | Abandoned n (%) | | Deceased n (%) | |
|---|---|---|---|---|---|---|---|---|
| **Aetiology** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** |
| **PAD** | 63 (28.8%) | 73 (31.5%) | 108(49.3%) | 126 (54.3%) | 13 (5.9%) | 3 (1.3%) | 35 (16%) | 30 (12.9%) |
| **Diabetes** | 180 (46.4%) | 204 (45.7%) | 128 (33%) | 157 (35.2%) | 21 (5.4%) | 1.4 (3.1%) | 59 (15.2%) | 71 (15.9%) |
| **Trauma or burns** | 14 (70%) | 12 (54.5%) | 2 (10%) | 9 (40.9%) | 3 (15%) | 0 (0%) | 1 (5%) | 1 (4.5%) |
| **Tumour** | 6 (46.2% | 8 (57.1%) (8) | 2 (15.4%) | 6 (42.9%) | 2 (15.4%) | 0 (0%) | 3 (23.1%) | 0 (0%) |
| **Congenital deformity** | 0 (0%) | 1 (100%) | 1 (50%) | 0 (0%) | 0(0%) | 0 (0%) | 1 (50%) | 0 (0%) |
| **Drug abuse** | 18 (75%) | 7 (38.9%) | 4 (16.7%) | 8 (44.4%) | 0 (0%) | 2 (11.1%) | 2 (8.3%) | 1 (5.6%) |
| **Venous disease** | 5 (62.5%) | 0 (0%) | 3 (37.5%) | 2 (100%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Ortho - all** | | 21 (60%) | - | 11 (31.4%) | - | 0 (0%) | - | 3 (8.6%) |
| **Ortho non-union** | 2 (100%) | - | 0 (0%) | - | 0 (0%) | - | 0 (0%) | - |
| **Ortho joint replacement** | 2 (40%) | - | 2 (40%) | - | 0 (0%) | - | 1 (20%) | - |
| **Ortho acquired deformity** | 0 (0%) | - | 1 (50%) | - | 0 (0%) | - | 1 (50%) | - |
| **Blood borne infection** | 1 (14.3%) | 4 (36.4%) | 4 (57.1%) | 5 (45.5%) | 2 (28.6%) | 0 (0%) | 0 (0%) | 2 (18.2%) |
| **Renal Failure** | 1 (100%) | 1 (50%) | 0 (0%) | 1 (50%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **CRPS** | 1 (20%) | 2 (100%) | 4 (80%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| **Acute vascular incident** | 4 (57.1%) | 6 (40%) | 1 (14.3%) | 7 (46.7%) | 0 (0%) | 0 (0%) | 2 (28.6%) | 2 (13.3%) |

### 4.2.10 Patients with Unilateral and Bilateral Amputations

Table 16 shows the number of unilateral and bilateral amputees for the years 2019 -2023. In this table patients with bilateral MLLA includes all patients who were bilateral in the reported year. Bilateral MLLAs are defined in more detail in Table 17 where there are two groups shown: those amputees who had a prior amputation; and those who were not previously amputees, that is, underwent bilateral amputations in the same episode of care.

**Table 16 Unilateral and bilateral amputees, 2019 – 2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Number of amputees** | 691 | 100% | 677 | 100% | 673 | 100% | 704 | 100% | 802 | 100% |
| **Unilateral amputees** | 545 | 78.8% | 564 | 83.3% | 554 | 82.3% | 578 | 82.1% | 671 | 80.3% |
| **Bilateral amputees** | 146 | 21.2% | 113 | 16.7% | 119 | 17.6% | 126 | 17.9% | 131 | 15.7% |

**Table 17 Bilateral amputees, 2019- 2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Bilateral Total** | 146 | 100% | 113 | 100% | 119 | 100% | 126 | 100% | 131 | 100% |
| **Bilateral – prior amputation(s)** | 104 | 71.2% | 81 | 71.7% | 94 | 79% | 102 | 81% | 97 | 74% |
| **Bilateral – both in same episode** | 42 | 28.8% | 32 | 28.3% | 25 | 21% | 24 | 19% | 34 | 26% |

### 4.2.11 Bilateral Amputations

Demographic and final outcome data for all with bilateral amputations are shown below in Table 18, 2022 and 2023

**Table 18 Demographic profile and final outcome summary of those with bilateral amputations at end of rehabilitation period, 2022 & 2023**

| | Bilateral TTA | | Bilateral TFA | | TTA & TFA | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Number** | 54 | 64 | 35 | 42 | 36 | 24 |
| **Age (median, years)** | 66 | 65 | 66 | 71 | 69 | 68 |
| **Sex (Male)-n (%)** | 45 (83%) | 55 (86%) | 23 (66%) | 28 (67%) | 27 (75%) | 17 (71%) |
| **Aetiology** | | | | | | |
| **PAD without diabetes-n (%)** | 8 (14.8%) | 13 (20.3%) | 16 (45.7%) | 19 (45.2%) | 12 (33.3%) | 6 (25%) |
| **Diabetes-n (%)** | 43 (79.6%) | 46 (71.9%) | 17 (48.6%) | 21 (50%) | 21 (58.3%) | 17 (70.8%) |
| **Other-n (%)** | 3 (5.6%) | 5 (7.8%) | 2 (5.7%) | 2 (4.8%) | 3 (8.4%) | 1 (4.2%) |
| **Final Outcome** | | | | | | |
| **Limb-fitted-n (%)** | 34 (63%) | 41 (64.1%) | 0 (0%) | 0 (0%) | 4 (11.1%) | 4 (16.7%) |
| **Non-Limb-fitted-n (%)** | 16 (29.6%) | 16 (25%) | 32 (91.4%) | 37 (88.1%) | 25 (69.4%) | 15 (62.5%) |
| **Died-n (%)** | 3 (5.6%) | 7 (10.9%) | 2 (5.7%) | 5 (11.9%) | 6 (16.7%) | 5 (20.8%) |
| **Abandoned-n (%)** | 1 (1.9%) | 0 (0%) | 1 (2.9%) | 0 (0%) | 1 (2.8%) | 0 (0%) |
| **Missing-n (%)** | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |

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

### 4.2.12 Bilateral Amputations in Same Episode of Care

The number and levels of bilateral amputations carried out in the same episode of care are shown in Table 19 below for 2019-2023.

**Table 19 Bilateral amputations, 2019-2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **Bilateral TTA** | 17 | 16 | 13 | 10 | 14 |
| **Bilateral TFA** | 22 | 10 | 9 | 10 | 15 |
| **TTA & TFA** | 2 | 4 | 3 | 4 | 5 |
| **Other** | 1 | 2 | 0 | 0 | 0 |
| **Total** | 42 | 32 | 25 | 24 | 34 |

Abbreviations: TFA=transfemoral, TTA=transtibial

### 4.2.13 Falls

Table 20 shows falls recorded for all amputees and also for unilateral and bilateral amputees (all levels) 2022 and 2023. Table 21 shows falls at home, for all amputees who had outpatient physiotherapy. Falls at home are not recorded for those who do not receive any physiotherapy following in patient discharge. Note this is not the number of falls but is the number of amputees who reported a fall during their rehabilitation period. Table 22 shows recorded falls in hospital for 2019 – 2023. Table 23 shows falls recorded both in hospital and at home by limb fitting outcome for 2022 and 2023.

**Table 20 Reported falls in hospital for all amputees and also for unilateral and bilateral amputees (all levels) 2022 & 2023.**

| **Amputee Inpatient rehab** | **All Amputees** | | **Unilateral** | | **Bilateral -** previously unilateral | | **Bilateral –** same episode | |
|---|---|---|---|---|---|---|---|---|
| | **2022** n=704 | **2023** n=802 | **2022** n=578 | **2023** n=671 | **2022** n=102 | **2023** n=97 | **2022** n=24 | **2023** n=34 |
| **In hospital n (%)** | 141 (20%) | 136 (17%) | 123 (21%) | 124 (18%) | 14 (14%) | 9 (9%) | 4 (17%) | 3 (9%) |

**Table 21 Recorded falls at home for all amputees who had outpatient physiotherapy 2022 & 2023.**

| **Amputees Outpatient rehab** | **All Amputees** | | **Unilateral** | | **Bilateral -** previously unilateral | | **Bilateral -** same episode | |
|---|---|---|---|---|---|---|---|---|
| | **2022** n=297 | **2023** n=339 | **2022** n=258 | **2023** n=294 | **2022** n=32 | **2023** n=36 | **2022** n=7 | **2023** n=9 |
| **At home n (%)** | 54 (18%) | 75 (22%) | 49 (19%) | 68 (23%) | 5 (16%) | 4 (11%) | 0 (0%) | 3 (33%) |

**Table 22 Recorded falls for all amputees 2019 – 2023.**

| **Recorded falls** | **2019** | **2020** | **2021** | **2022** | **2023** |
|---|---|---|---|---|---|
| **In hospital %** | 20.5% | 19% | 19% | 20% | 17% |
| **At home %** | 25.4% | 17% | 15% | 18% | 22% |

**Table 23 Recorded Falls based on Limb Fitting Outcome 2022 & 2023.**

| | **Limb-Fitted** | | **Non-Limb-fitted** | | **Abandoned** | |
|---|---|---|---|---|---|---|
| | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** |
| **Falls in hospital %** | 21% | 24% | 20% | 13% | 24% | 26% |
| **Falls at home %** | 18% | 22% | n/a | n/a | 24% | 32% |

### 4.2.14 Revisions and Re-amputations

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

Re-amputations from the transtibial to the transfemoral level for 2019-2023 are shown in Table 25.

**Table 24 Revisions and re-amputations, 2019-2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Amputations** | 733 | 100% | 709 | 100% | 698 | 100% | 728 | 100% | 836 | 100% |
| **Revisions** | 14 | 1.9% | 20 | 2.8% | 11 | 1.6% | 12 | 1.6% | 21 | 2.5% |
| **Re-amputations** | 43 | 5.7% | 33 | 4.7% | 39 | 5.6% | 47 | 6.5% | 47 | 5.6% |
| **Total revisions + re-amputations** | 57 | 7.8% | 53 | 7.5% | 50 | 7.1% | 60 | 8.2% | 68 | 8.1% |

**Table 25 Transtibial to transfemoral re-amputations, 2019-2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Initial TTA** | 440 | 100% | 403 | 100% | 407 | 100% | 459 | 100% | 496 | 100% |
| **Re-amputated to TFA** | 41 | 9.3% | 31 | 7.7% | 38 | 9.3% | 45 | 9.8% | 43 | 8.7% |

Abbreviations: TFA=transfemoral, TTA=transtibial

### 4.2.15 Functional Co-morbidities Index

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

The FCI is completed by scoring 1 if a disease is present, that is, diagnosed and recorded in the medical notes of a patient, and 0 if not. A score of 0 indicates no co-morbid disease and a score of 18 the highest number of co-morbid illnesses.
Table 26 shows FCI by level and aetiology 2022 and 2023. The mean scores for 2019 – 2023 are shown in table 27.

**Table 26 Functional Co-Morbidities by Level and Aetiology, 2022 & 2023**

| | Number | | Min | | Max | | Mean | |
|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **All** | 701 | 801 | 0 | 0 | 8 | 9 | 2.8 | 2.7 |
| **Level of Amputation** | | | | | | | | |
| **Unilateral TTA** | 335 | 355 | 0 | 0 | 8 | 9 | 2.8 | 2.8 |
| **Unilateral TFA** | 232 | 293 | 0 | 0 | 8 | 7 | 2.7 | 2.5 |
| **Other** | 9 | 21 | 0 | 0 | 7 | 3 | 1.5 | 1.1 |
| **All Bilateral** | 126 | 131 | 0 | 0 | 7 | 9 | 3 | 3 |
| **Bilateral TTA** | 54 | 64 | 0 | 0 | 7 | 9 | 3.2 | 3 |
| **Bilateral TFA** | 35 | 42 | 0 | 1 | 6 | 7 | 2.8 | 2.8 |
| **TTA & TFA** | 36 | 24 | 1 | 0 | 6 | 6 | 2.9 | 3.2 |
| **Aetiology** | | | | | | | | |
| **PAD without diabetes** | 219 | 232 | 0 | 0 | 7 | 7 | 2.6 | 2.4 |
| **Diabetes** | 388 | 447 | 1 | 0 | 8 | 9 | 3 | 3.1 |
| **Other** | 94 | 122 | 0 | 0 | 7 | 8 | 1.8 | 1.4 |

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

**Table 27 Functional Co-morbidities Mean Score, 2019 – 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **All** | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 |
| **Unilateral TTA** | 2.9 | 2.7 | 2.8 | 2.8 | 2.8 |
| **Unilateral TFA** | 2.9 | 2.8 | 2.8 | 2.7 | 2.5 |
| **Other** | 0.5 | 1.7 | 1.0 | 1.5 | 1.1 |
| **All Bilateral** | 3.0 | 3.0 | 3.0 | 3.0 | 3 |
| **PAD without diabetes** | 2.8 | 2.0 | 2.0 | 2.6 | 2.4 |
| **Diabetes** | 3.3 | 3.0 | 3.0 | 3.0 | 3.1 |

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 2019-2023 are presented in Table 28. These figures capture the first method of compression used.

**Table 28 Type of compression therapy used, 2019-2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Elset 'S' bandage** | 0 | 0% | 2 | 0.6% | 1 | 0.3% | 0 | 0% | 0 | 0% |
| **Flowtron** | 1 | 0.3% | 2 | 0.6% | 4 | 1.1% | 0 | 0% | 0 | 0% |
| **Plaster cast** | 75 | 20.9% | 82 | 23.4% | 63 | 17.3% | 75 | 17.2% | 34 | 7.2% |
| **Shrinker sock** | 266 | 74.1% | 246 | 70.3% | 278 | 76.4% | 332 | 76.1% | 416 | 88.5% |
| **Silicone Sleeve** | 0 | 0% | 2 | 0.6% | 0 | 0% | 2 | 0.5% | 1 | 0.2% |
| **Other** | 0 | 0% | 1 | 0.3% | 2 | 0.5% | 2 | 0.5% | 0 | 0% |
| **PPAM*** | 17 | 4.7% | 15 | 4.3% | 16 | 4.4% | 25 | 5.7% | 19 | 4% |
| **Total** | 359 | 100% | 350 | 100% | 364 | 100% | 436 | 100% | 470 | 100% |

Abbreviations= PPAM Aid= Pneumatic Post Amputation Mobility Aid
*Inclusion of PPAM aid here indicates it has been used without the walking frame for compression therapy only

**Table 29 Type of compression therapy used by amputation level (limb fitted), 2022 & 2023**

| | TTA (%) | | TFA (%) | | Bilateral TTA (%) | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Plaster cast** | 20.6% | 10.2% | n/a | n/a | 26.5% | 12.2% |
| **Shrinker sock** | 74.8% | 86% | 69.4% | 87.5% | 73.5% | 85.4% |
| **PPAM aid bag** | 2.3% | 3.8% | 22.2% | 5.4% | 0% | 0% |
| **Unknown** | 1.8% | 0% | 5.6% | 7.1% | 0% | 2.4% |

## 5.2 Early Walking Aids

The types of Early Walking Aids (EWA) used in 2019-2023 are shown in Table 30. Table 31 shows EWA used by amputation level; these figures relate to the first device used.

**Table 30 Type of EWA used, 2019-2023**

| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % |
| **Femurett** | 36 | 11.7% | 34 | 12.7% | 50 | 16.8% | 51 | 13.4% | 60 | 15.3% |
| **PPAM** | 273 | 88.3% | 232 | 86.6% | 247 | 83.2% | 331 | 86.6% | 332 | 84.7% |
| **Other** | 0 | 0% | 2 | 0.7% | 0 | 0% | 0 | 0% | 0 | 0% |
| **Total** | 309 | 100% | 268 | 100% | 297 | 100% | 382 | 100% | 392 | 100% |

Abbreviations: PPAM= Pneumatic Post Amputation Mobility Aid

**Table 31 Type of EWA used by amputation level (Limb-fitted), 2022 & 2023**

| | TTA (%) | | TFA (%) | | Bilateral TTA (%) | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **PPAM aid** | 95% | 94.9% | 36.1% | 28.6% | 94.1% | 75.6% |
| **Femurett** | n/a | n/a | 58.3% | 69.6% | n/a | n/a |
| **Unknown** | 5% | 5.1% | 5.6% | 1.8% | 5.9% | 22% |

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

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

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

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

**Table 32 Locomotor Capabilities Index by level, 2019 - 2023**

| | **6/12 Pre-amp** | | | **Final Outcome** | | | |
|---|---|---|---|---|---|---|---|
| **2019** | **Basic** | **Adv.** | **Total** | **Basic** | **Adv.** | **Total** | **Change** |
| **Transtibial** (n=210) | 23 | 20 | 43 | 21 | 16 | 37 | **-6** |
| **Transfemoral** (n= 38) | 24 | 22 | 46 | 19 | 12 | 31 | **-15** |
| **Bilateral transtibial** (n= 27) | 19 | 15 | 34 | 16 | 11 | 27 | **-7** |
| | **6/12 Pre-amp** | | | **Final Outcome** | | | |
| **2020** | **Basic** | **Adv.** | **Total** | **Basic** | **Adv.** | **Total** | **Change** |
| **Transtibial** (n=165) | 24 | 20 | 44 | 20 | 16 | 36 | **-8** |
| **Transfemoral** (n=40) | 25 | 23 | 48 | 20 | 13 | 33 | **-15** |
| **Bilateral transtibial** (n= 24) | 23 | 20 | 43 | 18 | 11 | 29 | **-14** |
| | **6/12 Pre-amp** | | | **Final Outcome** | | | |
| **2021** | **Basic** | **Adv.** | **Total** | **Basic** | **Adv.** | **Total** | **Change** |
| **Transtibial** (n=193) | 25 | 22 | 47 | 21 | 17 | 38 | **-9** |
| **Transfemoral** (n=68) | 25 | 22 | 47 | 19 | 13 | 32 | **-15** |
| **Bilateral transtibial (n= 18)** | **24** | **19** | **43** | **20** | **12** | **31** | **-12** |
| | **6/12 Pre-amp** | | | **Final Outcome** | | | |
| **2022** | **Basic** | **Adv.** | **Total** | **Basic** | **Adv.** | **Total** | **Change** |
| **Transtibial** (n=216) | 24 | 21 | 45 | 21 | 17 | 38 | **-7** |
| **Transfemoral** (n=37) | 25 | 23 | 48 | 18 | 14 | 32 | **-16** |
| **Bilateral transtibial (**n=32) | **23** | **18** | **42** | **18** | **13** | **31** | **-11** |
| | **6/12 Pre-amp** | | | **Final Outcome** | | | |
| **2023** | **Basic** | **Adv.** | **Total** | **Basic** | **Adv.** | **Total** | **Change** |
| **Transtibial** (n=208) | 24 | 21 | 46 | 21 | 17 | 37 | **-6.5** |
| **Transfemoral** (n=59) | 26 | 24 | 50 | 19 | 13 | 32 | **-15** |
| **Bilateral transtibial** (n=27) | 24 | 21 | 45 | 21.5 | 17 | 38 | **-3** |

# 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 |
|---|---|
| *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' |

**Figure 1 Rehabilitation Milestones**

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

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

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

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

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

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

| Groups with results prepared for all milestones | Additional groups for *days to inpatient discharge* |
|---|---|
| Transtibial Unilateral Fitted | Transtibial Unilateral Not Fitted |
| Transfemoral Unilateral Fitted | Transfemoral Unilateral Not Fitted |
| Bilateral* Fitted | Bilateral* Not Fitted |

**Figure 2 Groups in milestones**

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

## 6.2 Days to Casting

**Table 33** **Days to casting milestone, descriptive statistics, 2022 & 2023.**

| | All | | Unilateral TTA | | Unilateral TFA | | Bilateral TTA | | TTA & TFA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| Number Included | 360 | 387 | 252 | 257 | 54 | 72 | 35 | 41 | 5 | 4 |
| Lower Quartile (days) | 26 | 26 | 25 | 25 | 32 | 40 | 25 | 23.5 | 37 | 13 |
| Upper Quartile (days) | 65 | 74 | 54 | 58 | 107 | 101 | 63 | 63.5 | 87 | 36 |
| Median (days) | 36 | 39 | 33 | 35 | 60 | 62 | 36 | 34 | 42 | 17.5 |

Abbreviations: TFA=transfemoral, TTA=transtibial

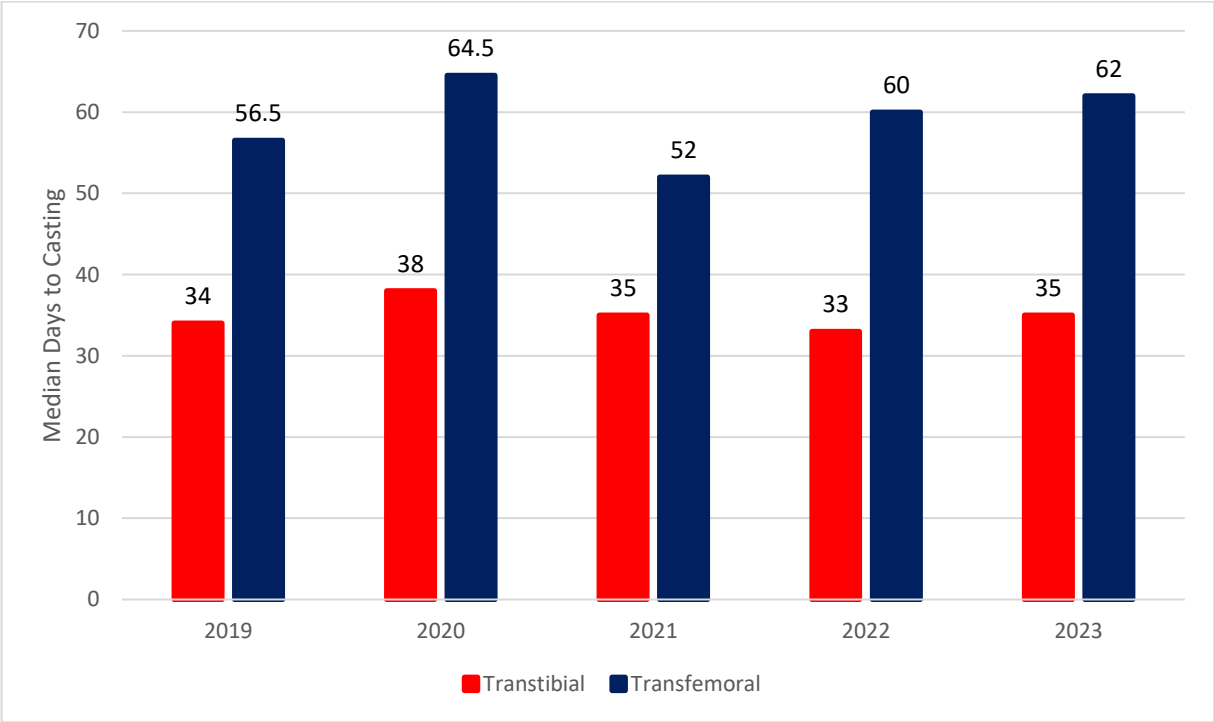


**Figure 3** **Median days to casting milestone, for all unilateral TTA and unilateral TFA, 2019-2023**

## 6.3 *Casting to Delivery*

**Table 34 Casting to delivery milestone, descriptive statistics, 2022 & 2023**

| | All | | Unilateral TTA | | Unilateral TFA | | Bilateral TTA | | TTA & TFA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** |
| **Number Included** | 356 | 382 | 249 | 254 | 53 | 70 | 35 | 41 | 5 | 4 |
| **Lower Quartile** (days) | 7 | 10 | 7 | 9 | 8 | 13 | 7 | 11.5 | 7 | 14.5 |
| **Upper Quartile** (days) | 14 | 19 | 14 | 17 | 21 | 21 | 14 | 19 | 22 | 36 |
| **Median** (days) | 8 | 14 | 7 | 14 | 14 | 14 | 9 | 14 | 7 | 17.5 |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 35 Median casting to delivery milestone, 2019-2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **TTA** (days) | 8 | 7 | **7** | 7 | 14 |
| **TFA** (days) | 14 | 7 | 9 | 14 | 14 |

Abbreviations: TFA=transfemoral, TTA=transtibial

## 6.4 Days to Inpatient Discharge: Fitted with a Prosthesis

**Table 36 Days to in-patient discharge, limb-fitted, descriptive statistics, 2022 and 2023**

| | Unilateral TTA | | Unilateral TFA | | Bilateral TTA | |
|---|---|---|---|---|---|---|
| | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** |
| **Number Included** | 218 | 235 | 36 | 56 | 34 | 41 |
| **Lower Quartile** (days) | 16 | 21 | 18 | 21.5 | 19 | 22 |
| **Upper Quartile** (days) | 56 | 64 | 62 | 82 | 71 | 99 |
| **Median** (days) | 37 | 37 | 35 | 35 | 42 | 33 |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 37 Median days to in-patient discharge, limb-fitted, 2019-2023 (Unilateral Only)**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **TTA** | 40 | 32 | 38 | 37 | 37 |
| **TFA** | 41 | 26 | 28.5 | 35 | 35 |

Abbreviations: TFA=transfemoral, TTA=transtibial

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

**Table 38 Days to in-patient discharge, patients' not limb-fitted, descriptive statistics, 2022 & 2023.**

| | Unilateral TTA | | Unilateral TFA | | Bilateral TTA | | Bilateral TFA | | TTA & TFA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Number Included** | 43 | 77 | 141 | 171 | 16 | 15 | 32 | 37 | 25 | 15 |
| **Lower Quartile** (days) | 17 | 34.5 | 24 | 24 | 22 | 14 | 15 | 31 | 18 | 16 |
| **Upper Quartile** (days) | 91 | 92 | 78 | 81 | 123 | 66 | 61 | 124 | 69 | 77 |
| **Median** (days) | 38 | 63 | 47 | 50 | 60 | 43 | 29 | 75 | 43 | 36 |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 39 Median days to in-patient discharge, patients not limb-fitted, 2019-2023 (Unilateral Only)**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **TTA** (days) | 40 | 39 | 51 | 38 | 63 |
| **TFA** (days) | 42.5 | 36 | 36 | 47 | 50 |

Abbreviations: TFA=transfemoral, TTA=transtibial

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

Table 40 shows the days from inpatient discharge to outpatient discharge (length of outpatient rehabilitation) for all limb-fitted patients 2022 and 2023; however, this does not consider the frequency or type of rehabilitation which will vary from hospital to hospital. The different models of care are described in Section 9.

**Table 40 Days from in-patient discharge to out-patient discharge, limb-fitted, 2022 & 2023**

| | Unilateral TTA | | Unilateral TFA | | Bilateral TTA | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Number Included** | 218 | 235 | 36 | 56 | 34 | 41 |
| **Lower Quartile** | 48 | 65 | 125 | 80 | 52 | 40.5 |
| **Upper Quartile** | 162 | 189 | 237 | 229 | 205 | 180 |
| **Median** | 92 | 113 | 175 | 167.5 | 142 | 93 |

Abbreviations: TFA=transfemoral, TTA=transtibial

**Table 41 Median Days from in-patient discharge to outpatient discharge, limb-fitted 2019 – 2023**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **TTA (days)** | 80.5 | 91 | 79 | 92 | 113 |
| **TFA (days)** | 153 | 141 | 181 | 175 | 167.5 |
| **Bilateral (days)** | 111 | 74 | 51 | 142 | 93 |

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

## 7.1 Statistics Presented

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

## 7.2 Trends in Compression Therapy

Of the patients receiving compression therapy, the percentage who received it within 10 days of amputation is shown in Table 42 for 2019-2023. A line chart representing this data is shown in Figure 4

**Table 42 Patients receiving compression therapy within 10 days of amputation (%), 2019– 2023.**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| TTA | 71.5 | 69.7 | 70 | 77 | 69 |
| TFA | 40.6 | 42.2 | 47.6 | 60 | 46 |

Abbreviations: TFA=transfemoral, TTA=transtibial

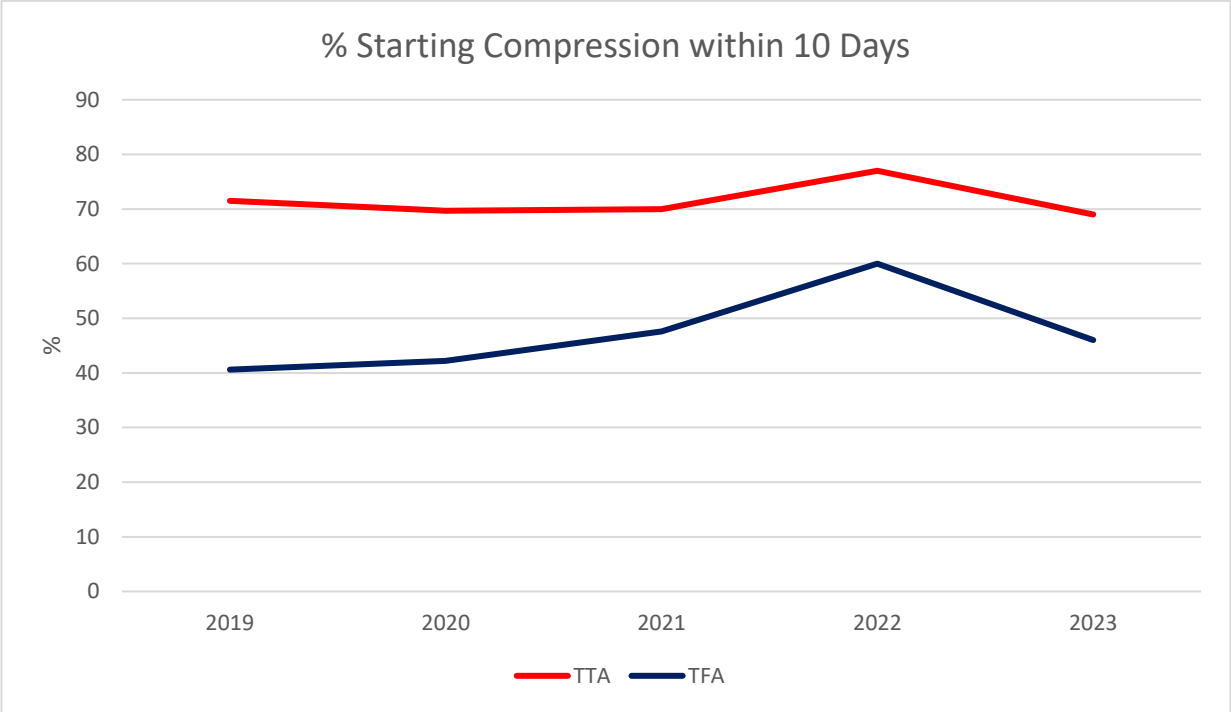


**Figure 4 Percentage of unilateral transtibial and transfemoral amputees receiving compression therapy within 10 days of amputation surgery, 2019– 2023.**

## 7.3 Trends in Early Walking Aids

Table 43 shows the percentage of those who received Early Walking Aid (EWA) therapy within 10 days of amputation surgery for 2017-2021, categorised by level of amputation. Note this only includes patients who received EWA therapy. A line chart representing this data is shown in Figure 5

**Table 43 Patients using EWAs within 10 days of amputation (%), 2019– 2023.**

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| TTA | 28.6 | 43.2 | 39.3 | 34 | 34 |
| TFA | 16.1 | 20.3 | 19.7 | 19 | 11 |

Abbreviations: TFA=transfemoral, TTA=transtibial

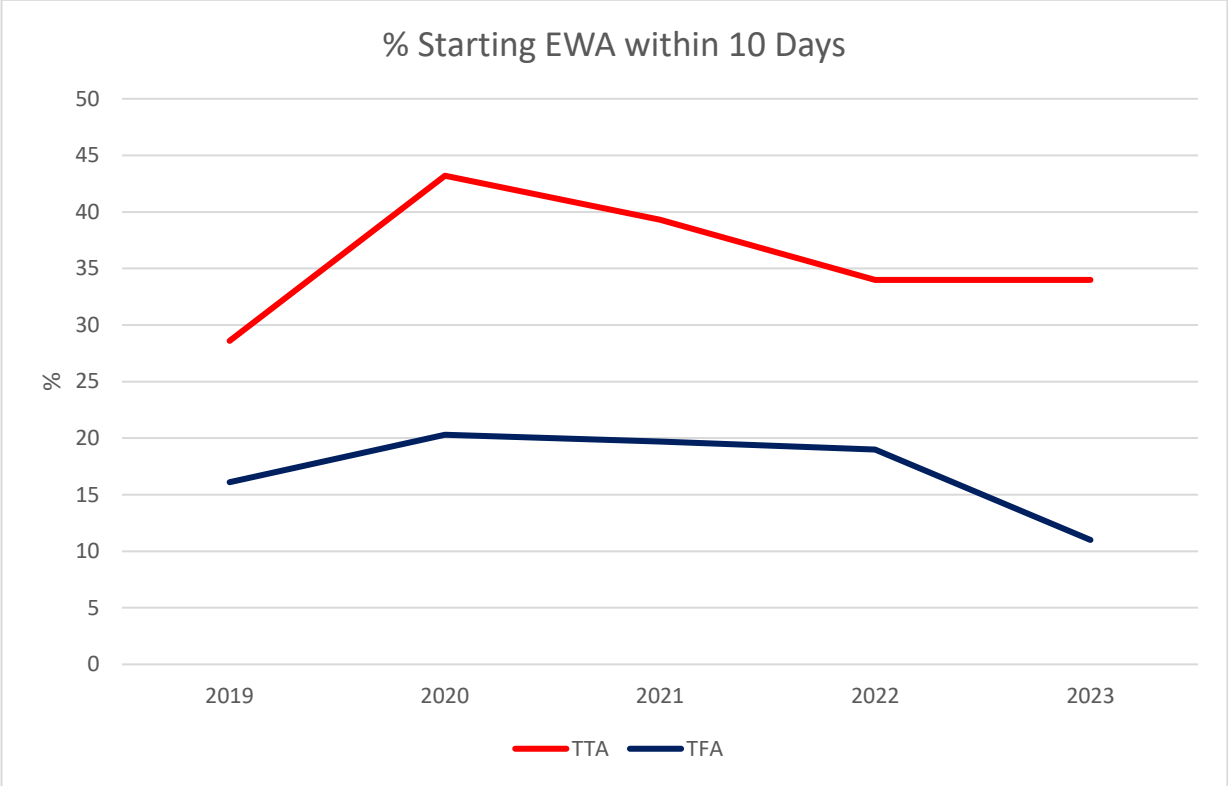


**Figure 5 Percentage of unilateral transtibial and transfemoral amputees using EWAs within 10 days of amputation surgery, 2019- 2023.**

# 8 Limb -fitting Centres

## 8.1 Hospital to Limb fitting centre

Each of the five limb-fitting centres receives referrals depending upon their geographical location. Table 44 shows which limb-fitting centre each hospital refers to; the number of amputees in 2022 from each hospital, and the percentage successfully limb-fitted at each centre categorised into unilateral transtibial (TTA) and unilateral transfemoral (TFA) level.

**Table 44 Limb-fitting centres, referring hospitals and % limb-fitted, 2022.**

| Limb-fitting Centres (LFC) | Referring hospital (n= number of TTA & TFA) | % Limb-fitted Unilateral TTA | % Limb-fitted Unilateral TFA |
|---|---|---|---|
| **WestMARC (n=304)**<br>NHS GG&C<br>NHS Forth Valley<br>NHS D&G<br>NHS Lanarkshire<br>NHS A&A | Queen Elizabeth University Hospital (n=160) | 62% | 21% |
| | Glasgow Royal Infirmary (n=15) | 100% | 20% |
| | Royal Alexandria Hospital (n=0) | n/a | n/a |
| | Monklands University Hospital (n=0) | n/a | n/a |
| | Wishaw General Hospital (n=3) | 0% | 0% |
| | Hairmyres Hospital (n=121) | 60% | 15% |
| | Forth Valley Royal Hospital (n=0) | n/a | n/a |
| | Dumfries and Galloway Royal Infirmary (n=2) | 100% | 100% |
| | Golden Jubilee National Hospital (n=1) | n/a | 0% |
| | Western Isles (n=2) | n/a | 0% |
| **Ayr (n=41)**<br>WestMARC satellite clinic | Ayr University Hospital (n=41) | 67% | 5% |
| **SMART (n=109)**<br>NHS Lothian<br>NHS Borders | Royal Infirmary of Edinburgh (n=108) | 69% | 13% |
| | St John's Hospital, Livingstone (n=0) | n/a | n/a |
| | Borders General (n=1) | 100% | n/a |
| **TORT (n=76)**<br>NHS Tayside<br>NHS Fife | Ninewells Hospital (n=76) | 57% | 16% |
| | Victoria Hospital, Kirkcaldy (n=0) | n/a | n/a |
| **Raigmore (n=38)**<br>NHS Highland | Raigmore Hospital (n=38) | 83% | 11% |
| **MARS (n=87***)**<br>NHS Grampian | Aberdeen Royal Infirmary (n=82)<br>Woodend Hospital (n=5) | ** | ** |

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

***please note the numbers for MARS include all levels of amputation

Table 45 shows which limb-fitting centre each hospital refers to; the number of amputees in 2023 from each hospital, and the percentage Limb-fitted at each centre categorised into unilateral transtibial (TTA) and unilateral transfemoral (TFA) level.

**Table 45 Limb-fitting centres, referring hospitals and % limb-fitted, 2023.**

| Limb-fitting Centres (LFC) | Referring hospital (n= number of TTA & TFA) | % Limb-fitted TTA | % Limb-fitted TFA |
|---|---|---|---|
| **WestMARC (n=393)**<br>NHS GG&C<br>NHS Forth Valley<br>NHS D&G<br>NHS Lanarkshire<br>NHS A&A | Queen Elizabeth University Hospital (n=210) | 66% | 22% |
| | Glasgow Royal Infirmary (n=21) | 80% | 67% |
| | Royal Alexandria Hospital (n=1) | 100% | n/a |
| | Monklands University Hospital (n=1) | n/a | 100% |
| | Hairmyres Hospital (n=156) | 66% | 15% |
| | Forth Valley Royal Hospital (n=0) | n/a | n/a |
| | Dumfries and Galloway Royal Infirmary (n=2) | 0% | 0% |
| | Golden Jubilee National Hospital (n=0) | n/a | n/a |
| | University Hospital Wishaw (n=2) | 100% | 0% |
| **Ayr (n=9)**<br>WestMARC satellite clinic | Ayr University Hospital (n=9) | 78% | n/a |
| **SMART (n=117)**<br>NHS Lothian<br>NHS Borders | Royal Infirmary of Edinburgh (n=117) | 54% | 23% |
| | St John's Hospital, Livingstone (n=0) | n/a | n/a |
| | Borders General (n=0) | n/a | n/a |
| **TORT (n=104)**<br>NHS Tayside<br>NHS Fife | Ninewells Hospital (n=104) | 77% | 7% |
| | Victoria Hospital, Kirkcaldy (n=0) | n/a | n/a |
| **Raigmore (n=23)**<br>NHS Highland | Raigmore Hospital (n=23) | 53% | 12.5% |
| **MARS (n=110***)**<br>NHS Grampian | Aberdeen Royal Infirmary (n=105)<br>Woodend Hospital (n=5) | ** | ** |

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

***please note the numbers for MARS include all levels of amputation

## 8.2 Milestones by Limb-fitting centre

The number of, and milestones data for limb-fitted unilateral TTA are presented for each hospital in Table 46 for 2022 and 2023.

**Table 46 Key performance Indicators (milestones) for unilateral TTA, by limb-fitting centre, 2022 & 2023**

| Limb fitting Centre | Number | | Days to Casting | | Days to Delivery | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **WestMARC (NHS GG&C)** | 124 | 159 | 35 | 38 | 48 | 55 |
| **Ayr (satellite clinic of WestMARC)** | 18 | 8 | 43 | 44.5 | 53.5 | 58.5 |
| **SMART** | 50 | 33 | 29 | 35 | 38 | 42 |
| **TORT** | 35 | 48 | 28 | 26.5 | 42 | 38 |
| **Raigmore** | 24 | 8 | 29 | 29 | 32.5 | 32 |
| **MARS**** | ** | ** | ** | ** | ** | ** |
| **National Median** | 252 | 257 | 33 | 35 | 43.5 | 52 |

**No data as Grampian not included in report

**Definitions:**

Days to casting — Median days from final surgery to casting for prosthesis.

Days casting to delivery — Median days from final surgery to delivery of prosthesis

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# 9 Models of Care

Each hospital's model of care (MOC) varies and the impact this has on the achievement of rehabilitation milestones and outcomes is complex and influenced by many factors including patient demographics (see Table 47). Hebenton et al 2019 identified key aspects of services that appear to improve speed and outcomes of rehabilitation after lower limb amputation[1]. These key aspects have been used to develop the weighted MOC scoring system used in this report.

**Table 47 MOC Scoring system**

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

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

Section 9.1 includes each of the major centres Model of Care descriptor and their MOC score (as per the table above).
Each centres unilateral transtibial milestone data, for the last 5 years (2019 – 2023), Is also included in this section, with the exception of Grampian.

## 9.1 Individual Hospital data

### 9.1.1 Vascular Centralisation in Scotland

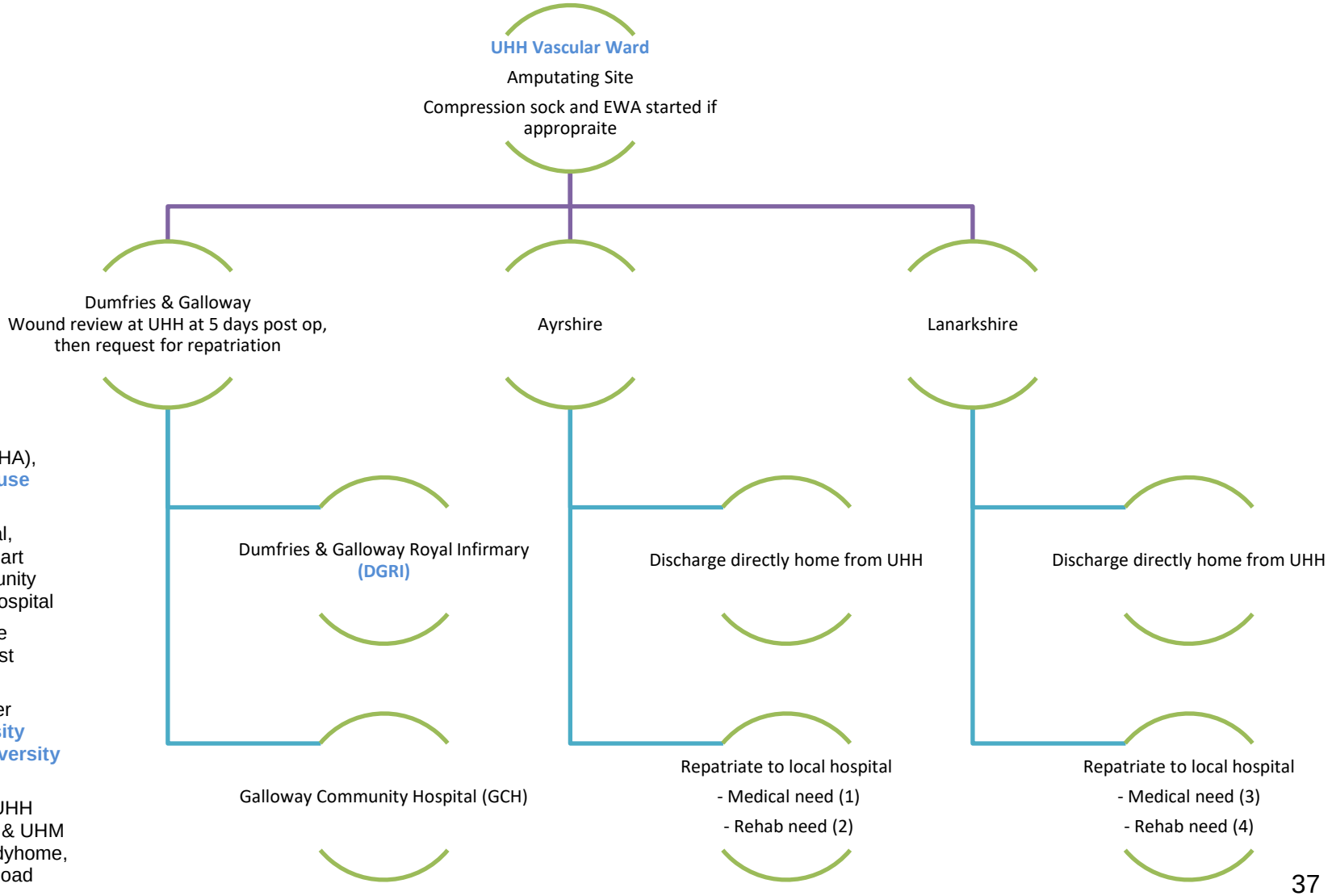
In early 2019, the vascular unit at Forth Valley Royal Hospital (FVRH) moved to Queen Elizabeth University Hospital (QEUH). Following this all patients requiring amputation surgery, which had previously been performed in FVRH, were transferred to QEUH, and then repatriated to FVRH, to continue their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

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

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

## 9.1.1.1 University Hospital Hairmyres (UHH) centralisation: Inpatient Pathway

**Blue text** = Specialist Amputee Physiotherapist on site




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

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

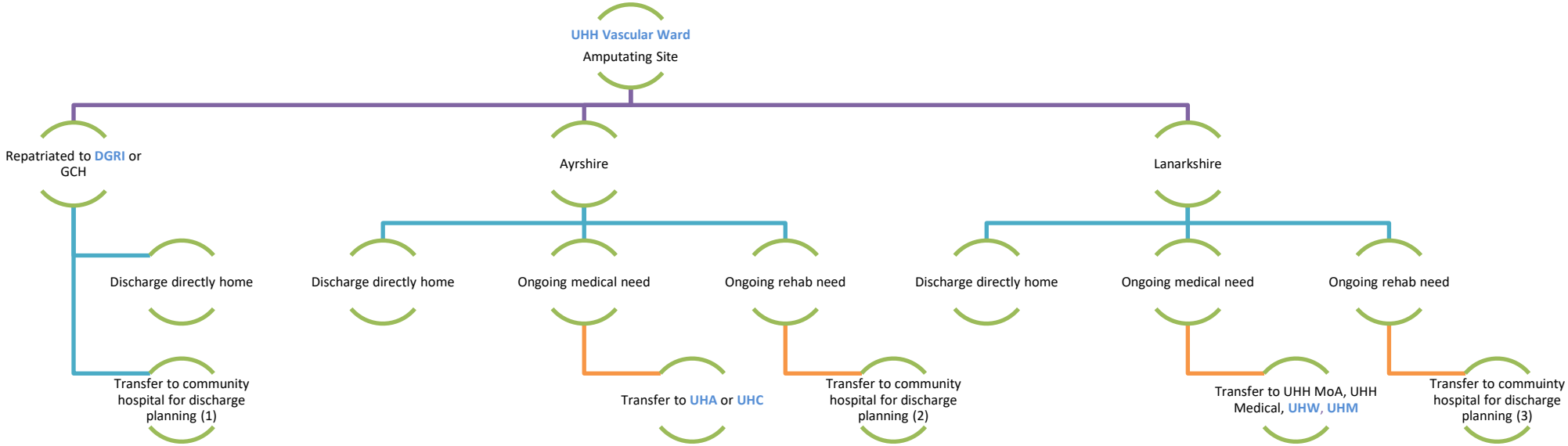
*All Ayrshire hospital sites have vascular in-reach from specialist physiotherapist*

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

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

## 9.1.1.2 University Hospital Hairmyres (UHH) Non Limb Fitting Pathway

**Blue text** = Specialist Amputee Physiotherapist on site



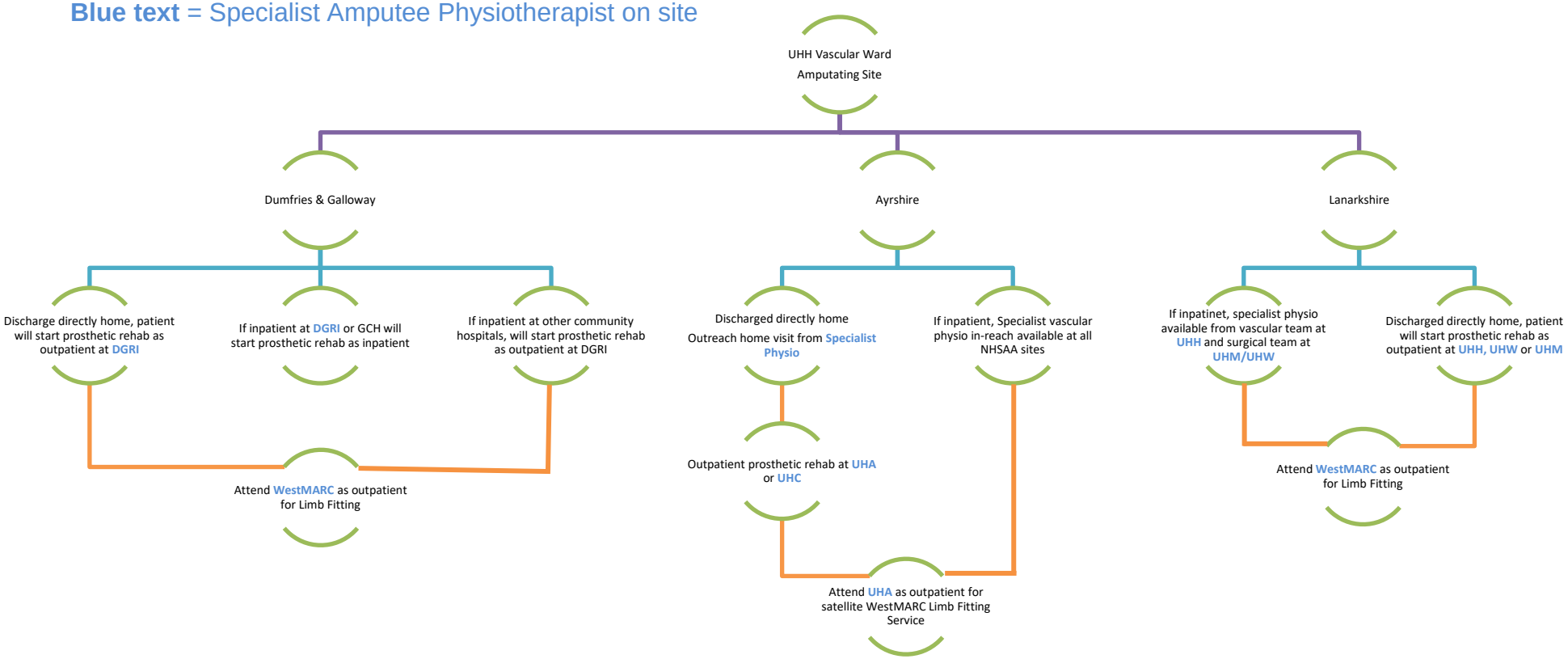

1. Annan, Castle Douglas, Lochmaben, Langhom

2. Arran War Memorial Hospital, Ayrshire Central Hospital, Biggart Hospital, East Ayrshire Community Hospital, Girvan Community Hospital – Specialist vascular physio in-reach available at all sites

3. Stonehouse, Blantyre Life, UHH MoA, **UHW, UHM** (surgical wards will have specialist input). From UHW & UHM may have further moves to Ladyhome, Kello, Wester Moffat, Airbles Road

## 9.1.1.3 University Hospital Hairmyres (UHH) Limb Fitting Pathway

**Blue text** = Specialist Amputee Physiotherapist on site

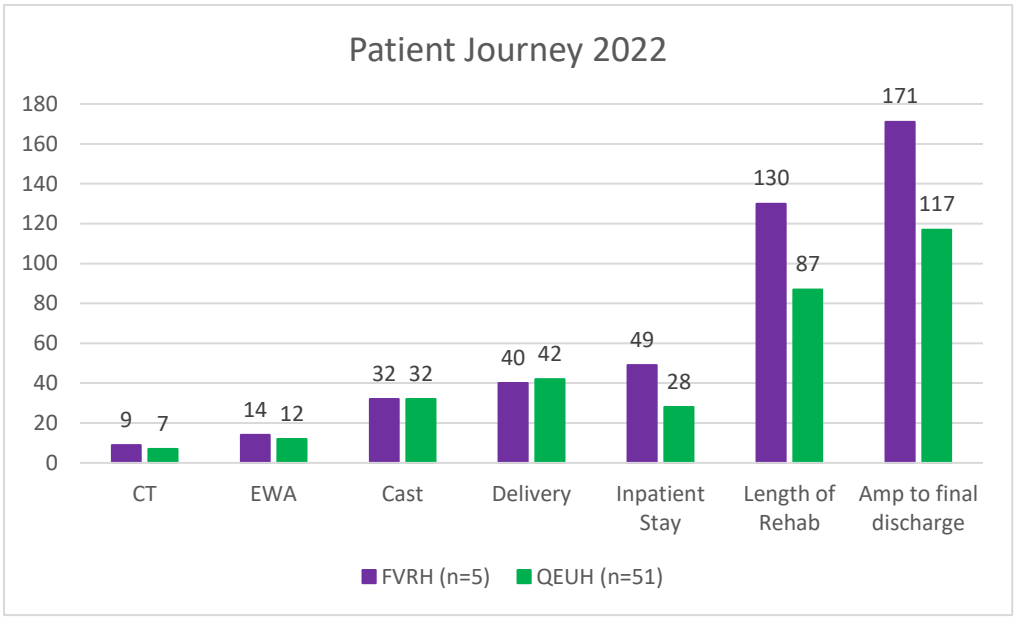



| Model of Care |
|---|
| ▪ Dumfries & Galloway Royal Infirmary – 2-3 sessions per week – 1 hour |
| ▪ University Hospital Ayr– 2 session per week – 1.5 hours |
| ▪ Ayrshire Central Hospital – 2 session per week – 1.5 hour |
| ▪ University Hospital Hairmyres - 1 session per week – 1 hour |
| ▪ University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

### 9.1.2 Patient Journey – Centralised Services

**Queen Elizabeth University Hospital - Patient journey**

The graphs below highlight the difference in patient journey for **transtibial** patients who go on to limb fit following amputation at QEUH. The length of rehab refers to inpatient discharge date to outpatient discharge date.



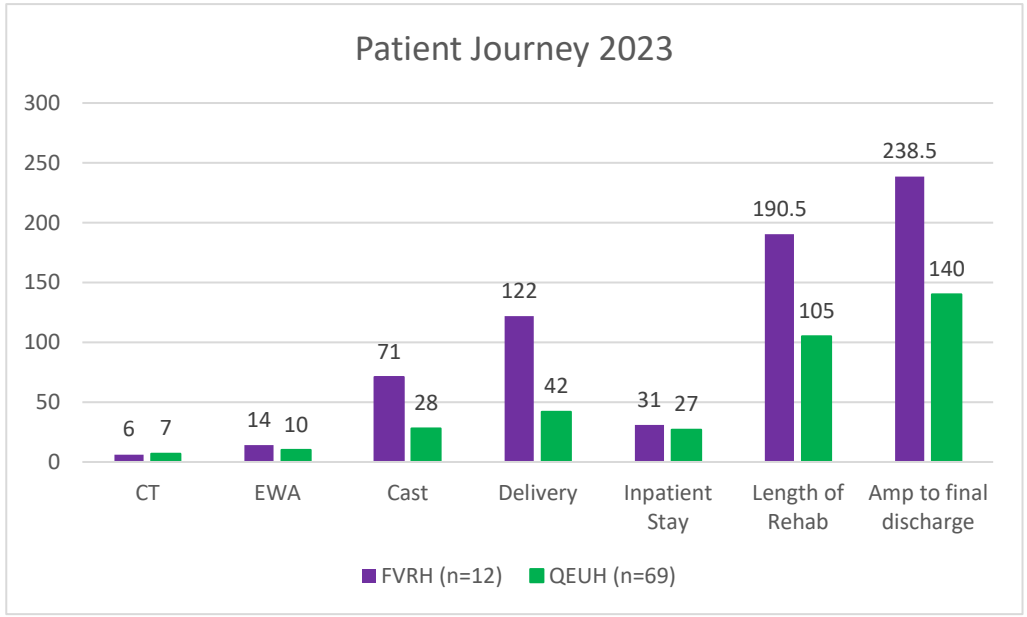




**Figure 6: Median days to milestones – QEUH Patient Journey**

**University Hospital Hairmyres – Patient Journey**

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

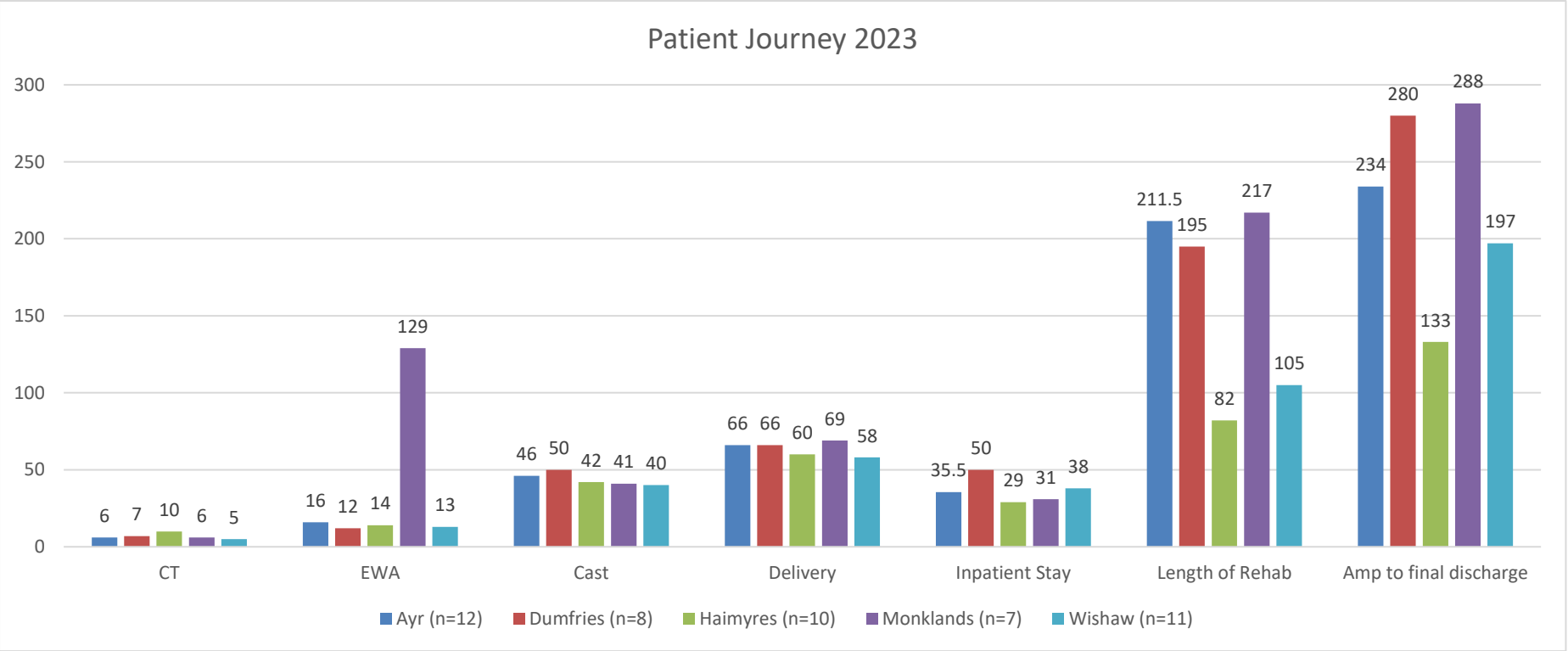



**Figure 7: Median days to milestones – UHH Patient Journey**

### 9.1.3 Aberdeen Royal Infirmary (ARI), NHS Grampian

Rehabilitation 'Primary' loop:

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

**MOC=7/11**

Rehabilitation 'home first' loop:

- Patients with delayed healing or other issues may be discharged home with support from outpatient specialist service and community rural teams
- Once healed and deemed appropriate for prosthetic provision patients will undertake pre-prosthetic EWA training via Horizons Rehabilitation Centre if they have transport or Community Rural Teams who have access to parallel bars. If none of these are available to the patient or patient has complex needs then they will be re-admitted to Links unit for assessment and provision of prosthetic

- Pre prosthetic Rehabilitation in Out Patient service is limited by staffing and transport but normally patient can access 2 x 1 hour sessions a week delivery via 0.6 WTE band 7 physiotherapist permanent; Loose access to Band 6 one day a week if available. Community Rural Settings normally are limited to once a week for one hour with clinicians varying in banding and experience. Additional support for these teams is given via the specialist teams at ARI and Horizons

### 9.1.4 University Hospital Ayr, NHS Ayrshire & Arran

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

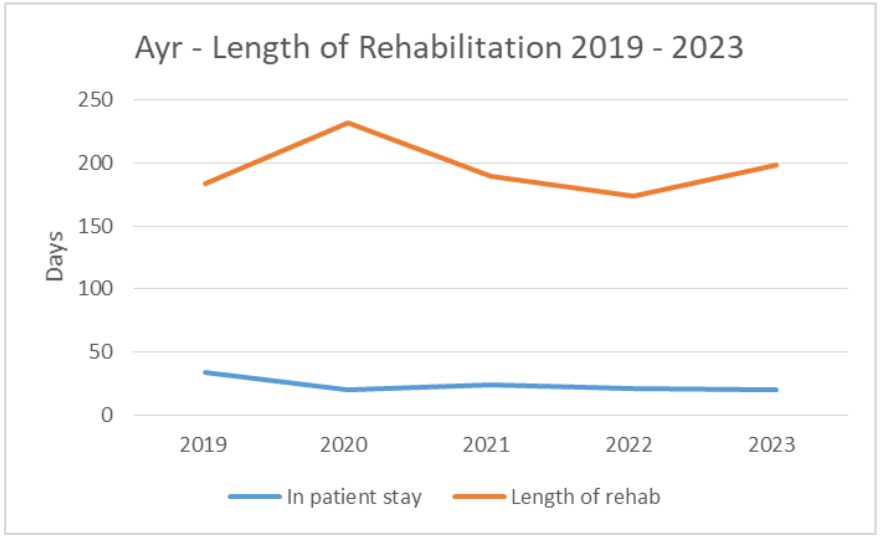
**MOC=6/11**

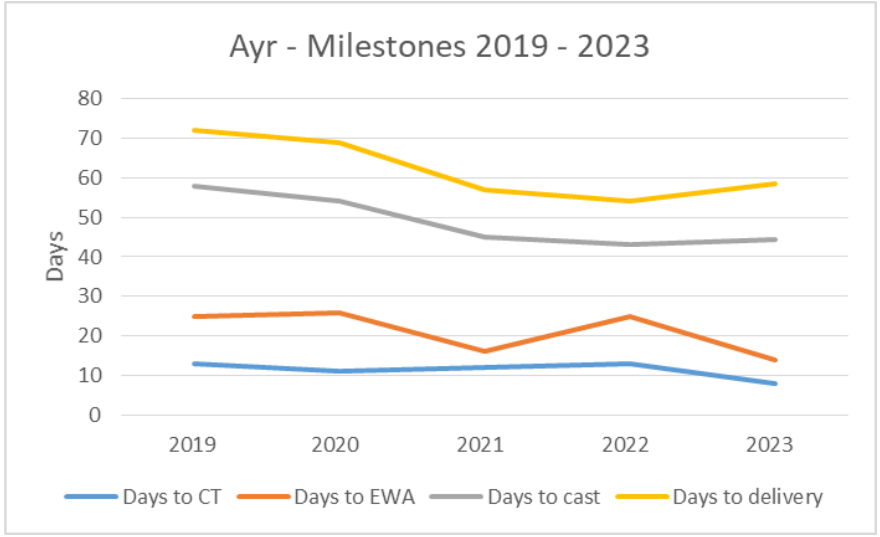
**It should be noted that from 2023 there is no vascular surgery at University Hospital Ayr**

## 5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)

| University Hospital Ayr – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted N (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 16 (80%) | 13 | 25 | 58 | 72 | 34 | 184 | -6 |
| 2020 | 14 (67%) | 11 | 26 | 54 | 69 | 20 | 231.5 | -12.5 |
| 2021 | 7 (50%) | 12 | 16 | 45 | 57 | 24 | 190 | -7 |
| 2022 | 14 (67%) | 13 | 25 | 43 | 54 | 21 | 174 | -10 |
| 2023 | 7 (78%) | 8 | 14 | 44.5 | 58.5 | 20 | 198 | 2 |

CT – Compression Therapy, EWA – Early Walking Aid.



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

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

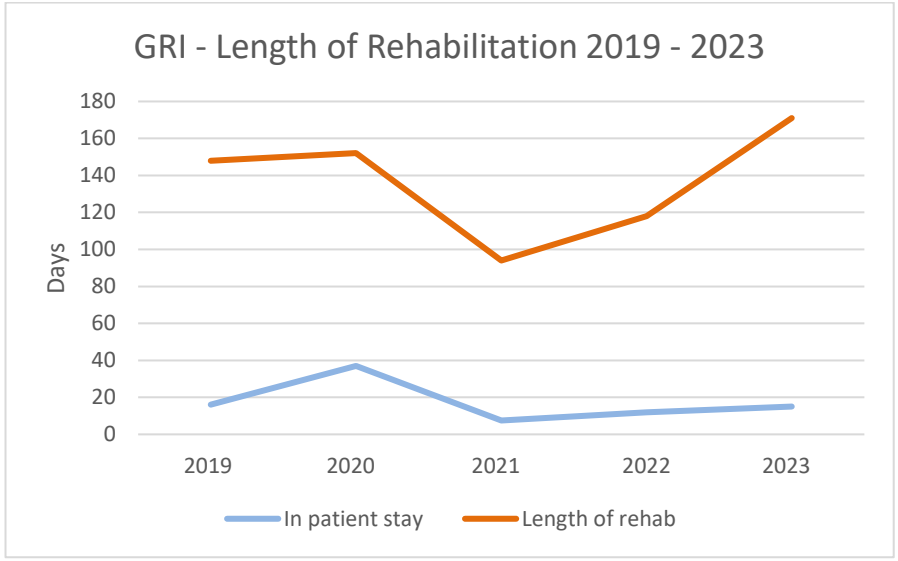
**MOC = 2/11**

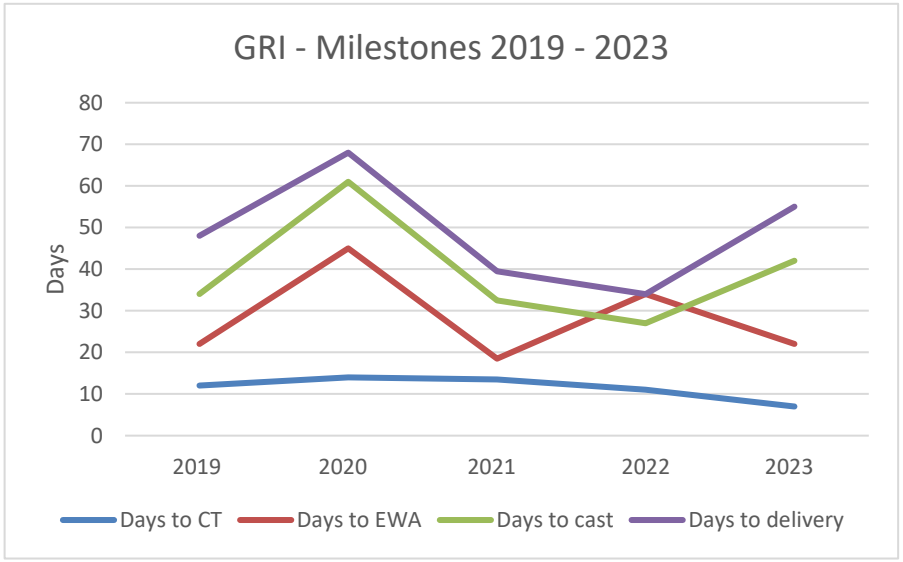
**<u>It should be noted that there is no vascular surgery at GRI</u>.**

**5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)**

| Glasgow Royal Infirmary – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 change |
| 2019 | 7 (88%) | 12 | 22 | 34 | 48 | 16 | 148 | 0 |
| 2020 | 9 (75%) | 14 | 45 | 61 | 68 | 37 | 152 | -7.5 |
| 2021 | 8 (89%) | 13.5 | 18.5 | 32.5 | 39.5 | 7.5 | 94 | -2.5 |
| 2022 | 5 (100%) | 11 | 34 | 27 | 34 | 12 | 118 | -1 |
| 2023 | 12 (80%) | 7 | 22 | 42 | 55 | 15 | 171 | 0.5 |

CT – Compression Therapy, EWA – Early Walking



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

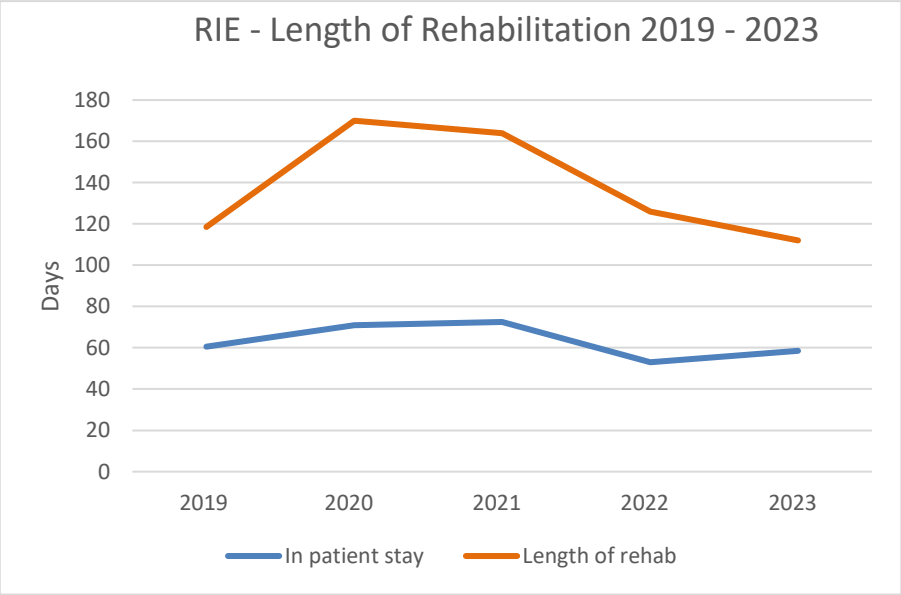
- Immediate post-operative rigid dressings are not routinely used
- Following amputation, patients at RIE will receive treatment from a non-specialist static physiotherapist. They will be reviewed by the in-reach team from Astley Ainslie Hospital and those who are appropriate for prosthetic review will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

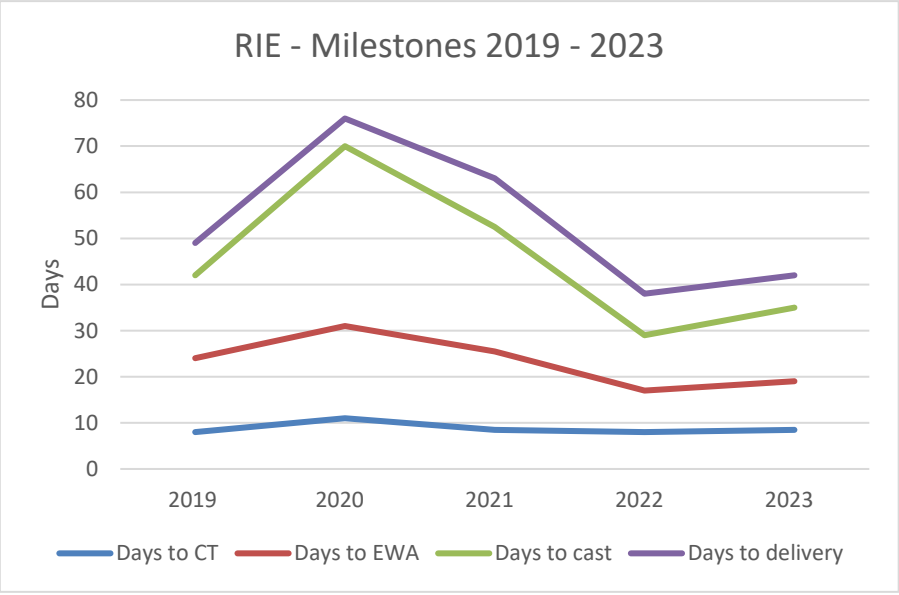
**MOC = 8/11**

## 5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)

| Royal Infirmary of Edinburgh/ Astley Ainsley Hospital – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 33 (61%) | 8 | 24 | 42 | 49 | 60.5 | 118.5 | -4 |
| 2020 | 27 (50%) | 11 | 31 | 70 | 76 | 71 | 170 | -10 |
| 2021 | 26 (57%) | 8.5 | 25.5 | 52.5 | 63 | 72.5 | 164 | -7.5 |
| 2022 | 47 (69%) | 8 | 17 | 29 | 38 | 53 | 126 | -4 |
| 2023 | 30 (54%) | 8.5 | 19 | 35 | 42 | 58.5 | 112 | -6 |

CT – Compression Therapy, EWA – Early Walking Aid



### 9.1.7 Raigmore Hospital, NHS Highland

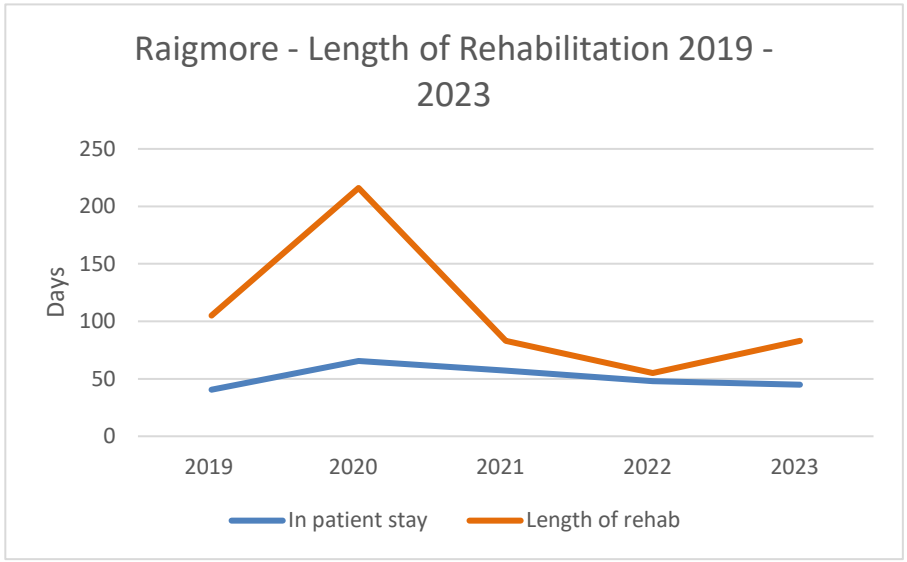
- Immediate post-operative rigid dressings are used with some patients (1).
- Following an amputation, patients at Raigmore Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will take the form of both one-to-one and group sessions based on the ward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

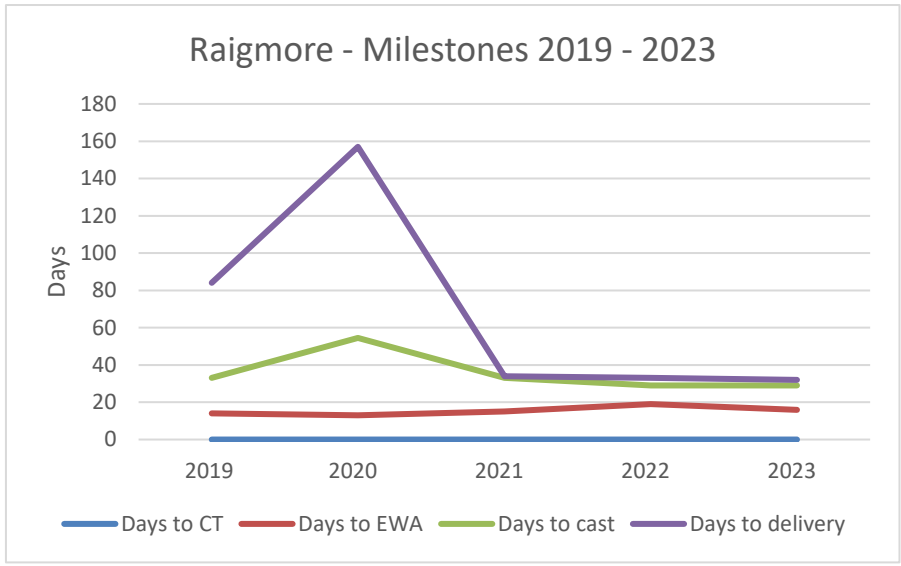
**MOC = 8/11**

**5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)**

| Raigmore Hospital – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 15 (68%) | 0 | 14 | 33 | 84 | 40.5 | 105 | -12 |
| 2020 | 14 (58%) | 0 | 13 | 54.5 | 157 | 65.5 | 216 | -13 |
| 2021 | 17 (59%) | 0 | 15 | 33 | 34 | 57 | 83 | -13 |
| 2022 | 24 (83%) | 0 | 19 | 29 | 33 | 48 | 55 | -11.5 |
| 2023 | 8 (53%) | 0 | 16 | 29 | 32 | 45 | 83 | -14.5 |

CT – Compression Therapy, EWA – Early Walking Aid.


Raigmore - Length of Rehabilitation 2019 - 2023
250
200
150
100
50
0
Days
2019
2020
2021
2022
2023
In patient stay
Length of rehab


Raigmore - Milestones 2019 - 2023
180
160
140
120
100
80
60
40
20
0
Days
2019
2020
2021
2022
2023
Days to CT
Days to EWA
Days to cast
Days to delivery

### 9.1.8 Ninewells Hospital, NHS Tayside

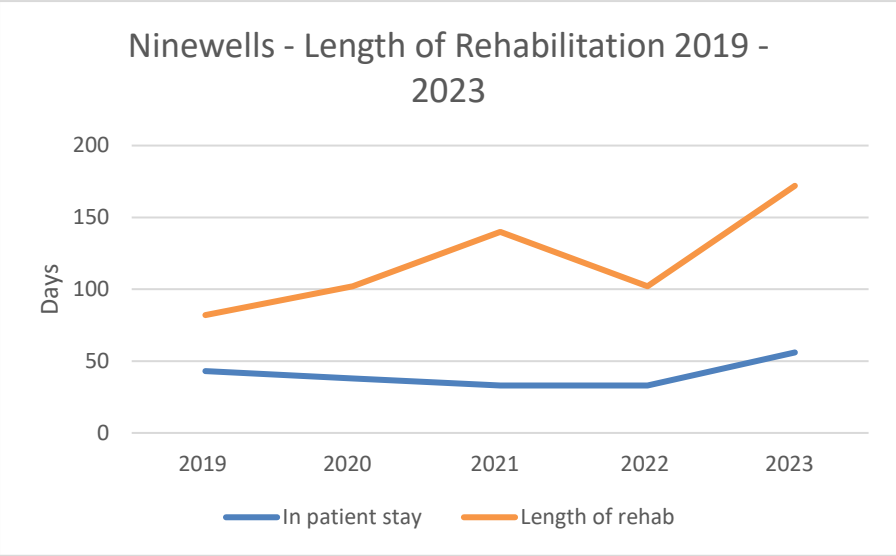
- Immediate post-operative rigid dressings are no longer routinely used.
- Following an amputation, all patients at Ninewells Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will take the form of one-to-one sessions, based mainly in the therapy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

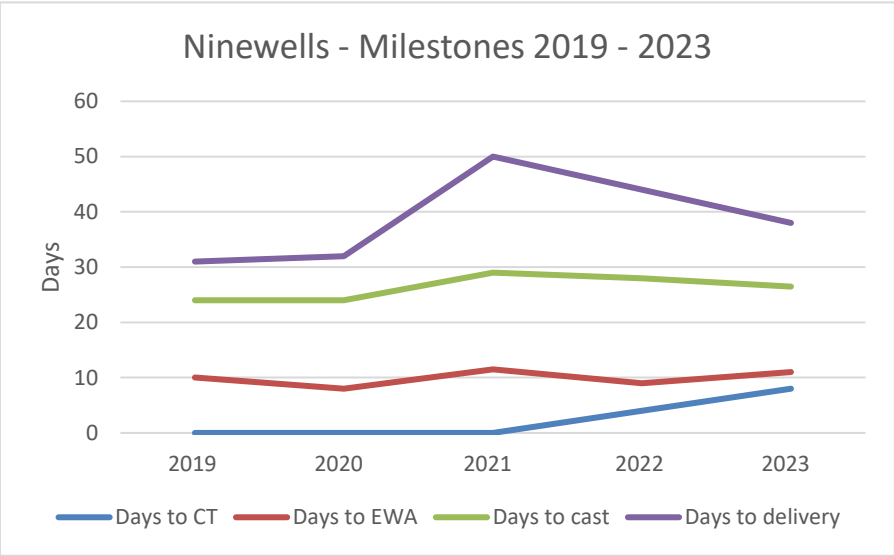
**MOC = 5/11**

**5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)**

| Ninewells Hospital – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 34 (81%) | 0 | 10 | 24 | 31 | 43 | 82 | -5 |
| 2020 | 41 (85%) | 0 | 8 | 24 | 32 | 38 | 102 | 0 |
| 2021 | 41 (80%) | 0 | 11.5 | 29 | 50 | 33 | 140 | -13 |
| 2022 | 29 (57%) | 4 | 9 | 28 | 44 | 33 | 102 | -8 |
| 2023 | 46 (77%) | 8 | 11 | 26.5 | 38 | 56 | 172 | -10 |

CT – Compression Therapy, EWA – Early Walking Aid.


Ninewells - Length of Rehabilitation 2019 - 2023
200
150
100
50
0
Days
2019
2020
2021
2022
2023
In patient stay
Length of rehab


Ninewells - Milestones 2019 - 2023
60
50
40
30
20
10
0
Days
2019
2020
2021
2022
2023
Days to CT
Days to EWA
Days to cast
Days to delivery

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

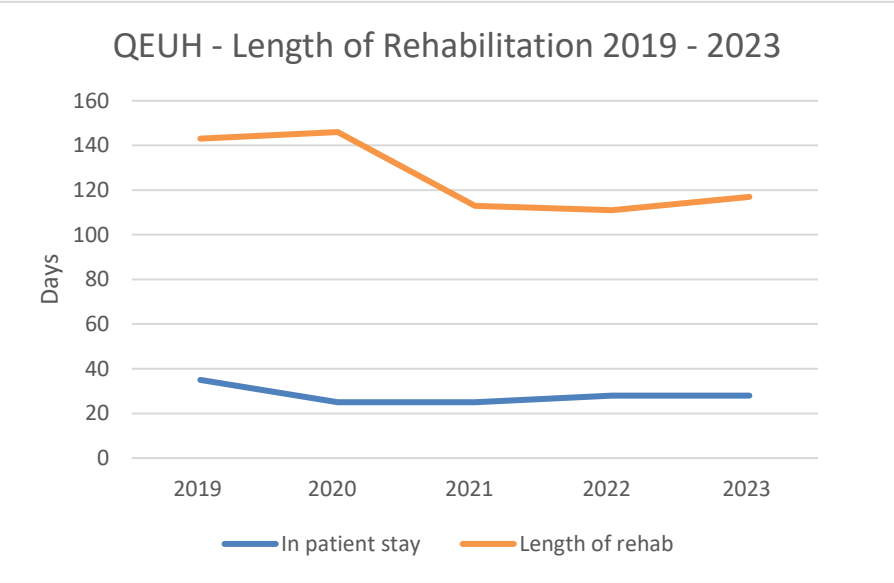
- Immediate post-operative rigid dressings are not routinely used
- Following an amputation, patients at QEUH will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will be provided in one-to-one and group sessions, based on the ward and in a therapy gym. Patients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

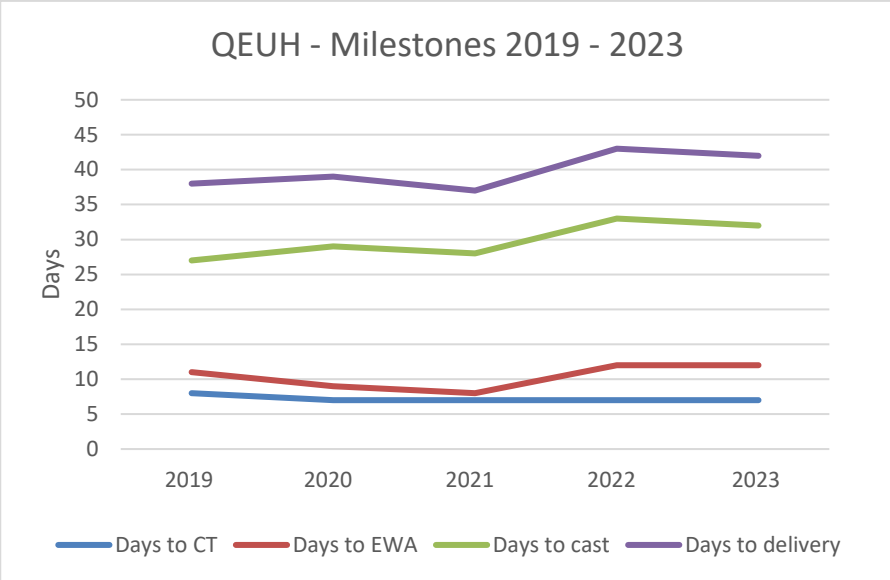
**MOC = 8/11**

**5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)**

| Queen Elizabeth University Hospital – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 43 (58%) | 8 | 11 | 27 | 38 | 35 | 143 | 0 |
| 2020 | 54 (60%) | 7 | 9 | 29 | 39 | 25 | 146 | -7 |
| 2021 | 76 (80%) | 7 | 8 | 28 | 37 | 25 | 113 | -3 |
| 2022 | 56 (62%) | 7 | 12 | 33 | 43 | 28 | 111 | -4 |
| 2023 | 81 (66%) | 7 | 12 | 32 | 42 | 28 | 117 | -5 |

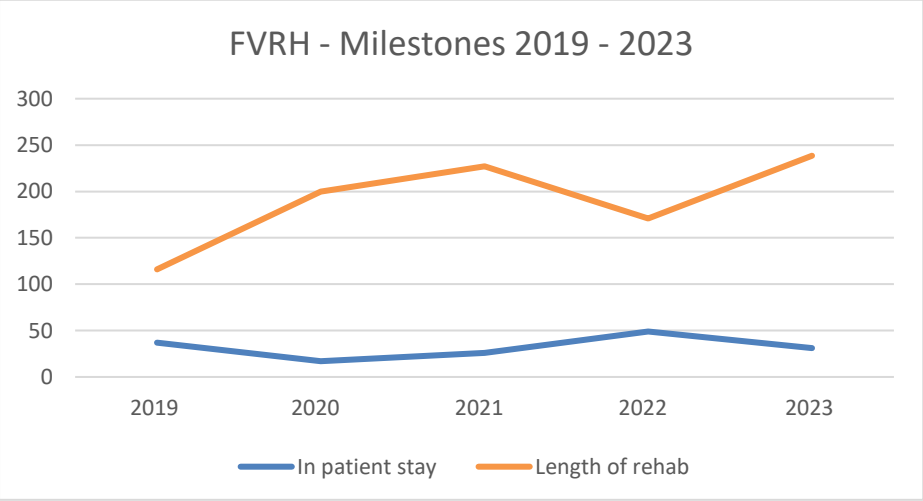
CT – Compression Therapy, EWA – Early Walking Aid

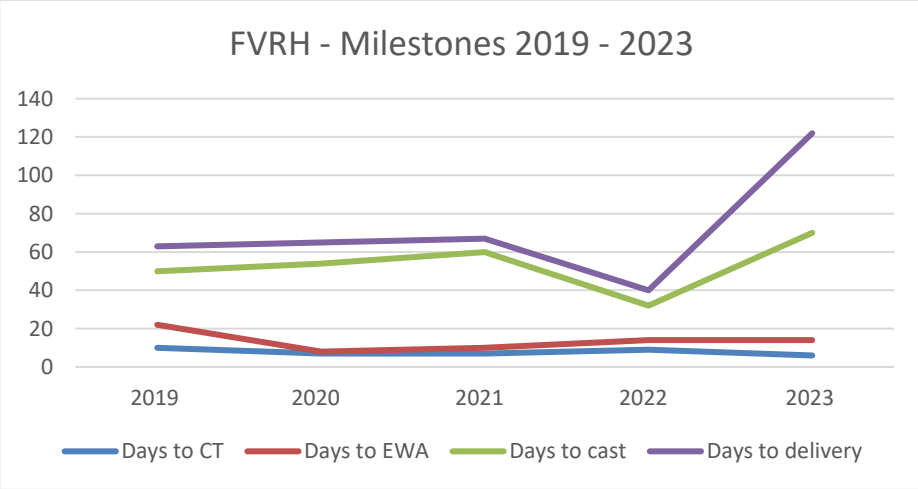



**Please note the above data refers to the patients who remained in GG&C for their rehabilitation journey**

| QEUH repatriated to FVRH – Unilateral Transtibial Milestones | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab |
| 2019 | 21 (72%) | 10 | 22 | 50 | 63 | 37 | 116 |
| 2020 | 6 (40%) | 7 | 8 | 54 | 65 | 17 | 200 |
| 2021 | 13 (76%) | 7 | 10 | 60 | 67 | 26 | 227 |
| 2022 | 5 (50%) | 9 | 14 | 32 | 40 | 49 | 171 |
| 2023 | 12 (50%) | 6 | 14 | 70 | 122 | 31 | 238.5 |




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

### 9.1.10 University Hospital Hairmyers, NHS Lanarkshire

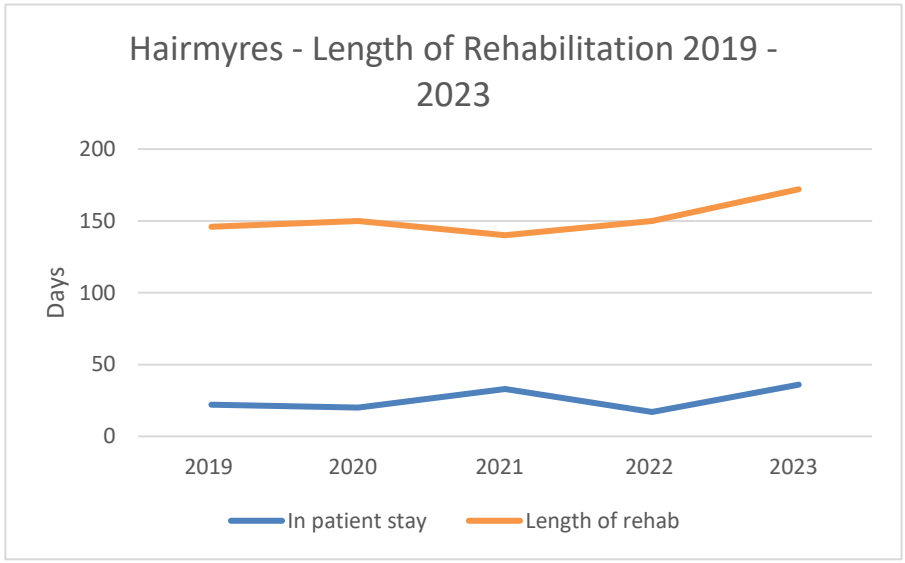
- Immediate post-operative rigid dressings are used with some patients (1)
- Following an amputation, patients at Hairmyres Hospital will receive treatment from a specialist physiotherapist (2).
- As an in-patient, physiotherapy will be provided in one-to-one and group sessions, based on the ward and in a therapy gym. Patients will routinely receive one treatment session daily Monday to Friday (3 ward sessions and 2 gym sessions) (1), with an average Gym treatment session lasting 60 minutes and the ward session 45 minutes (1).
- The Prosthetic service is delivered at WESTMARC.
- Patients who are appropriate for prosthetic-fitting will routinely be discharged before primary prosthetic review.
- Patients who are appropriate for prosthetic input will have access to routine out-patient physiotherapy follow-up at their nearest acute hospital. They will see a specialist physiotherapist (1) twice a week in a group exercise setting.
- Patients, who are not appropriate for prosthetic fitting, will receive the same level of in-patient input, but do not routinely access physiotherapy on discharge. This will be provided via a domiciliary service.

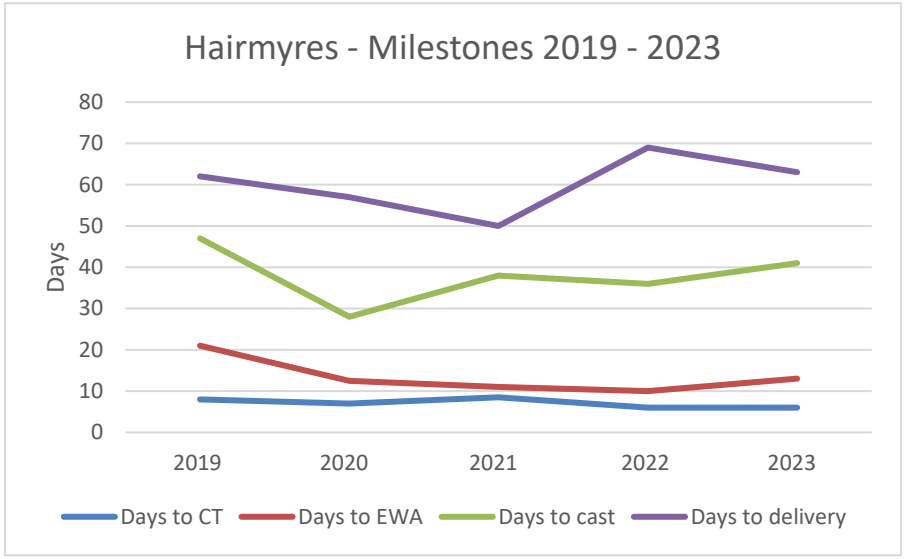
**MOC = 6/11**

**5-year milestone data following Unilateral Transtibial Amputation (2019 – 2023)**

| University Hospital Hairmyres – Unilateral Transtibial Milestones | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Limb-fitted n (%) | Days to CT | Days to EWA | Days to cast | Days to delivery | In patient stay | Length of rehab | LCI-5 Change |
| 2019 | 27 (51%) | 8 | 21 | 47 | 62 | 22 | 146 | -10 |
| 2020 | 19 (58%) | 7 | 12.5 | 28 | 57 | 20 | 150 | -10.5 |
| 2021 | 21 (66%) | 8.5 | 11 | 38 | 50 | 33 | 140 | -13 |
| 2022 | 29 (60%) | 6 | 10 | 36 | 69 | 17 | 150 | -10 |
| 2023 | 48 (66%) | 6 | 13 | 41 | 63 | 36 | 172 | -4 |

CT – Compression Therapy, EWA – Early Walking Aid.




As centralisation of services to University Hospital Hairmyres only occurred in 2023, we have not included a comparison of patient rehabilitation journeys. In the 2024 SPARG report we will start to present this in a similar way to the QEUH and FVRH section. The data for 2023 therefore does represent all patients who were amputated in Hairmyres, irrespective of where they attended outpatient rehabilitation.

# 10 Individual Hospital Summaries for 2021

## 10.1 Data Checking Summary

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

The number of amputees at each hospital and the data completeness are shown in Table 48, 2022 and 2023.

**Table 48 Data Checking Summary by Hospital, 2022 & 2023**

| | Forms issued (n=) | | Forms missing (n=) | | Forms complete(n=) | | Forms Incomplete (n=) | |
|---|---|---|---|---|---|---|---|---|
| **Hospital** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** | **2022** | **2023** |
| **Aberdeen Royal Infirmary** | 82 | 105 | 82 | 105 | 0 | 0 | 0 | 0 |
| **University Hospital Ayr** | 51 | 10 | 0 | 0 | 51 | 10 | 0 | 0 |
| **Borders General Hospital** | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **Dumfries & Galloway Royal Infirmary** | 5 | 3 | 0 | 0 | 5 | 3 | 0 | 0 |
| **Forth Valley Royal Hospital** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Glasgow Royal Infirmary** | 17 | 29 | 0 | 0 | 14 | 29 | 3 | 0 |
| **Golden Jubilee National Hospital** | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| **University Hospital Hairmyres** | 150 | 195 | 0 | 0 | 150 | 195 | 0 | 4 |
| **University Hospital Monklands** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| **Ninewells Hospital** | 102 | 127 | 0 | 0 | 102 | 127 | 0 | 0 |
| **Raigmore Hospital** | 46 | 31 | 0 | 0 | 46 | 31 | 0 | 0 |
| **Royal Alexandria Hospital** | 2 | 3 | 2 | 2 | 0 | 1 | 0 | 0 |
| **Royal Infirmary of Edinburgh** | 130 | 148 | 0 | 0 | 130 | 148 | 0 | 0 |
| **Queen Elizabeth University Hospital** | 197 | 251 | 3 | 0 | 193 | 251 | 1 | 2 |
| **St John's Hospital** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **University Hospital Wishaw** | 3 | 2 | 0 | 0 | 3 | 2 | 0 | 0 |
| **Woodend Hospital** | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 |
| **Inverclyde** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Western Isles** | 3 | 1 | 1 | 0 | 2 | 1 | 0 | 0 |
| **Outside Scottish Service** | 2 | 3 | 0 | 0 | 2 | 3 | 0 | 0 |
| **National** | **798** | **802** | **94** | **113** | **700** | **802** | **4** | **6** |

## 10.2 Key Performance Indicators by Hospital

Tables 49 to 53 only include those centres with > 10 amputation surgeries in 2022 and 2023. This is to ensure data protection and validity of data analysis.

### 10.2.1 Age and FCI

**Table 49 Median Age, and FCI, 2022 & 2023**

| Hospital | Median Age (years) | | Mean FCI | |
|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 |
| **Aberdeen Royal Infirmary** | ** | ** | ** | ** |
| **University Hospital Ayr** | 66 | 62 | 3.2 | 3.3 |
| **Glasgow Royal Infirmary** | 44 | 60 | 1.3 | 1.8 |
| **University Hospital Hairmyres** | 65 | 68 | 2.3 | 2.4 |
| **Ninewells Hospital** | 68 | 67 | 2.9 | 3 |
| **Queen Elizabeth University Hospital** | 67 | 65 | 2.8 | 2.6 |
| **Raigmore Hospital** | 72 | 69 | 3.6 | 3.7 |
| **Royal Infirmary of Edinburgh** | 68 | 66 | 2.8 | 2.6 |
| **National** | 67 | 66 | 2.8 | 2.7 |

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

## 10.2.2 Final Level of Amputation

The final level of Amputation at end of the rehabilitation period is recorded in Table 50, 2022 and 2023.

**Table 50 Final level of Amputation at end of Rehabilitation by Hospital, 2022 & 2023**

| Hospital | Unilateral TTA n (%) | | Unilateral TFA n (%) | | Other n (%) | | Bilateral TTA n (%) | | Bilateral TFA n (%) | | TTA & TFA n (%) | | Other n (%) | | Total n (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Aberdeen Royal Infirmary** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| **University Hospital Ayr** | 21 (41.2%) | 9 (90%) | 20 (39.2%) | 0 | 2 (4%) | 0 | 2 (3.9%) | 1 (10%) | 2 (3.9%) | 0 | 4 (7.8%) | 0 | 0 | 0 | 51 (100%) | 10 (100%) |
| **Glasgow Royal Infirmary** | 5 (29.4%) | 15 (51.7%) | 10 (58.8%) | 6 (20.7%) | 2 (11.8%) | 5 (17.3%) | 0 | 2 (6.9%) | 0 | 1 (3.4%) | 0 | 0 | 0 | 0 | 17 (100%) | 29 (100%) |
| **University Hospital Hairmyres** | 67 (44.7%) | 75 (38.5%) | 54 (36%) | 81 (41.5%) | 0 | 2 (1%) | 7 (4.7%) | 12 (6.2%) | 14 (9.3%) | 18 (9.2%) | 8 (5.3%) | 7 (3.6%) | 0 | 0 | 15 (100%) | 195 (100%) |
| **Ninewells Hospital** | 51 (50%) | 60 (47.2%) | 25 (24.5%) | 44 (34.6%) | 2 (2%) | 2 (1.6%) | 14 (13.7%) | 13 (10.2%) | 6.9 (7) | 4 (3.1%) | 3 (2.9%) | 4 (3.1%) | 0 | 0 | 102 (100%) | 127 (100%) |
| **Queen Elizabeth University Hospital** | 90 (46.4%) | 123 (49%) | 70 (36.1%) | 87 (34.7%) | 0 | 6 (2.4%) | 16 (8.2%) | 19 (7.6%) | 7 (3.6%) | 11 (4.4%) | 11 (5.7%) | 5 (2%) | 0 | 0 | 194 (100%) | 251 (100%) |
| **Raigmore Hospital** | 29 (63%) | 15 (48.4%) | 9 (19.6%) | 8 (25.8%) | 3 (6.5%) | 2 (6.5%) | 2 (4.3%) | 12.9 (4) | 0 | 0 | 3 (6.5%) | 2 (6.5%) | 0 | 0 | 46 (100%) | 31 (100%) |
| **Royal Infirmary of Edinburgh** | 68 (52.3%) | 56 (37.8%) | 40 (30.8%) | 61 (41.2%) | 0 | 3 (2.1%) | 11 (8.5%) | 13 (8.8%) | 4 (3.1%) | 8 (5.4%) | 7 (5.4%) | 6 (4.1%) | 0 | 1 (0.7%) | 130 (100%) | 148 (100%) |
| **National** | 335 (47.6%) | 357 (44.5%) | 234 (33.2%) | 293 (36.5%) | 9 (1.2%) | 21 (2.7%) | 54 (7.7%) | 64 (8%) | 36 (5%) | 42 (5.2%) | 36 (5.1%) | 24 (3%) | 1 (0.1%) | 1 (0.1%) | 704 (100%) | 802 (100%) |

Abbreviations: TFA=transfemoral, TTA=transtibial

### 10.2.3 Final Outcome

Final outcome (at discharge from physiotherapy) by hospital are shown in Table 51, 2022 and 2023.

**Table 51 Key Performance Indicators by Hospital, 2022 & 2023**

| Hospital | LF n (%) | | NLF n (%) | | Abandoned n (%) | | Died n (%) | | Total n (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **Aberdeen Royal Infirmary** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| **University Hospital Ayr** | 19 (37.3%) | 7 (70%) | 21 (41.2%) | 1 (10%) | 4 (7.8%) | 0 | 7 (13.7%) | 2 (20%) | 51 (100%) | 10 (100%) |
| **Glasgow Royal Infirmary** | 8 (50%) | 19 (65.5%) | 1 (6.3%) | 8 (27.6%) | 3 (18.8%) | 0 | 4 (25%) | 2 (6.9%) | 16 (100%) | 29 (100%) |
| **University Hospital Hairmyres** | 52 (34.7%) | 68 (34.9%) | 61 (40.7%) | 78 (40%) | 15 (10%) | 12 (6.2%) | 22 (14.7%) | 35 (17.9%) | 150 (100%) | 193 (99%) |
| **Ninewells Hospital** | 45 (44.1%) | 60 (47.2%) | 38 (37.3%) | 51 (40.2%) | 2 (2%) | 1 (0.8%) | 17 (16.7%) | 15 (11.8%) | 102 (100%) | 127 (100%) |
| **Queen Elizabeth University Hospital** | 81 (41.8%) | 115 (45.8%) | 70 (36.1%) | 101 (40.2%) | 12 (6.2%) | 5 (2%) | 31 (16%) | 30 (12%) | 194 (100%) | 251 (100%) |
| **Raigmore Hospital** | 27 (58.7%) | 11 (35.5%) | 11 (23.9%) | 16 (51.6%) | 1 (2.2%) | 0 | 7 (15.2%) | 4 (12.9%) | 46 (100%) | 31 (100%) |
| **Royal Infirmary of Edinburgh** | 60 (46.2%) | 53 (35.8%) | 52 (40%) | 75 (50.7%) | 2 (1.5%) | 1 (0.7%) | 16 (12.4%) | 19 (12.8%) | 130 (100%) | 148 (100%) |
| **National** | 297 (42.2%) | 339 (42.4%) | 260 (37%) | 332 (41.5%) | 41 (5.8%) | 19 (2.4%) | 104 (14.9%) | 107 (13.8%) | 703 (100%) | 800 (100%) |

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

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

The number of, and milestones data for limb-fitted unilateral transtibial amputees are presented for each hospital in Table 52, 2022 and 2023.

**Table 52 Key Performance Indicators (milestones) by hospital, 2022 & 2023**

| Hospital | Number of unilateral TTA | | % Limb Fitted | | Days to CT | | Days to EWA | | Days to Casting | | Days to Delivery | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **University Hospital Ayr** | 21 | 9 | 14 (67%) | 7 (78%) | 13 | 8 | 25 | 14 | 43 | 44.5 | 54 | 58.5 |
| **Glasgow Royal Infirmary** | 5 | 15 | 5 (100%) | 12 (80%) | 11 | 7 | 34 | 22 | 27 | 42 | 34 | 55 |
| **University Hospital Hairmyres** | 67 | 75 | 29 (60%) | 48 (66%) | 6 | 6 | 10 | 13 | 36 | 41 | 69 | 63 |
| **Ninewells Hospital** | 51 | 60 | 29 (57%) | 46 (77%) | 4 | 8 | 9 | 11 | 28 | 26.5 | 44 | 38 |
| **Queen Elizabeth University Hospital** | 90 | 123 | 56 (62%) | 81 (66%) | 7 | 7 | 12 | 11 | 33 | 31.5 | 43 | 46 |
| **Raigmore Hospital** | 29 | 15 | 24 (83%) | 8 (53%) | 0 | 0 | 19 | 16 | 29 | 29 | 33 | 32 |
| **Royal Infirmary of Edinburgh** | 68 | 56 | 47 (69%) | 30 (54%) | 8 | 8.5 | 17 | 19 | 29 | 35 | 38 | 42 |
| **National Median** | **335** | **357** | **218 (65%)** | **235 (66%)** | **7** | **7** | **12** | **13** | **33** | **35** | **44** | **52** |

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

**Definitions:**

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

**Table 53 Key Performance Indicators (milestones) by hospital, 2022 & 2023**

| Hospital | Number of unilateral TTA | | % Limb Fitted | | In Patient Stay | | Overall Length of Rehab | | LCI-5 change score | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 | 2023 |
| **University Hospital Ayr** | 21 | 9 | 14 (67%) | 7 (78%) | 21 | 20 | 174 | 198 | -10 | 2 |
| **Glasgow Royal Infirmary** | 5 | 15 | 5 (100%) | 12 (80%) | 12 | 15 | 118 | 171 | -1 | 0.5 |
| **University Hospital Hairmyres** | 67 | 75 | 29 (60%) | 48 (66%) | 17 | 36 | 150 | 172 | -10 | -4 |
| **Ninewells Hospital** | 51 | 60 | 29 (57%) | 46 (77%) | 33 | 56 | 102 | 172 | -8 | -10 |
| **Queen Elizabeth University Hospital** | 90 | 123 | 56 (62%) | 81 (66%) | 28 | 29 | 111 | 133 | -4 | -5 |
| **Raigmore Hospital** | 29 | 15 | 24 (83%) | 8 (53%) | 48 | 45 | 55 | 83 | -11.5 | -14.5 |
| **Royal Infirmary of Edinburgh** | 68 | 56 | 47 (69%) | 30 (54%) | 53 | 58.5 | 126 | 112 | -4 | -6 |
| **National Median** | **335** | **357** | **218 (65%)** | **235 (66%)** | **36** | **41** | **112** | **144** | **-7** | **-6** |

Abbreviations: Transtibial Amputation (TTA), LCI-5 see section 5.3, note a positive score is an improvement and a negative score demonstrates a deterioration, in community mobility, post amputation.

**Definitions:**

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 care.

# 11 References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# 12 Appendices

## 12.1 *Appendix A Bibliography & Research*

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## 12.2 *Appendix B Aetiology Mapping*

### Definition

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

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

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

### Mapping

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

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

## 12.3 *Appendix C Locomotor Capabilities Index 5*

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

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

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

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

| **Activity** | **6 months pre-admission** | **Final Discharge** |
|---|---|---|
| *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 | | |

## 12.4 *Appendix D Functional Co-morbidities Index*

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

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

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

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

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

## 12.5 *Appendix E Timed Up and Go Test (TUG)*

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

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

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

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

| **2023** | | | | | | |
|---|---|---|---|---|---|---|
| | **Median Change (seconds)** | **Median time pre** | **Median time post** | **IPDD to 1st TUG (median)** | **Walking aid pre** | **Walking aid post** |
| **Transtibial (n=89)** | -17.5 | 38 | 15 | 40 days | 2 | 5 |
| **Transfemoral (n=16)** | -8 | 59 | 39.5 | 78 days | 2 | 2 |
| **Bilateral Transtibial (n=10)** | -10 | 38 | 38 | 70 days | 2 | 2 |

**Walking aid key:**

**1** – Walking frame (any)

**2** – Crutches (any) x 2

**3** – Crutch (any) x 1

**4** – Walking Sticks x 2

**5** – Walking Sticks x 1

**6** – None

For further information please contact:

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