Prosthetics and Orthotics International

OPEN

A national survey to explore clinical data and outcome measure collection, storage, and use, within prosthetic rehabilitation services during implementation of the National Health Service England microprocessor controlled prosthetic knee clinical commissioning policy

Chantel Ostler[1,2], Mike McGrath[2], Amy Jones[3], John Sullivan[4] and Alex Dickinson[2]

Abstract

Background: Routine health care data remain underused for enhancing care quality, safety, and cost-effectiveness, and for research. Little is known about data collection and outcome measurement (OM) in English prosthetic services. This insight could inform health care quality improvement and future nationwide data initiatives.

Objective: To examine data collection and OM practice undertaken during implementation of the Microprocessor Controlled Prosthetic Knee Clinical Commissioning policy in English prosthetic services.

Study Design: Nationwide survey of practice.

Methods: An online survey was developed and piloted with clinicians working in English prosthetic rehabilitation centers. The survey was deployed to all 35 of England's prosthetic services. Centers were asked to complete one survey per center.

Results: Twenty-two centers completed the survey. Twenty of 21 patient data items were collected at rates >80%, whereas 5 of the 6 core outcomes were captured at rates exceeding 90%. Variation was observed in the scoring and administration methods of OMs across centers, limiting comparison of scores. Clinically, patient outcome data were most often used to inform individual decision making regarding microprocessor knee prescription (95%). However, 50% of centers suggested OMs needed to be more useful and relevant. Forty-one percent of centers do not collate data across patients.

Conclusions: The consistency of types of data captured demonstrate the importance of this data for implementation of the National Health Service England microprocessor knee policy. This work has identified several areas of variability, such as OM administration and collation of data, that present operational and educational challenges for the clinical use of routine health care data and OMs. These challenges need to be considered for those implementing future service provision policies or aiming to develop a national prosthetic data collection initiative.

Keywords

microprocessor knee policy, outcome measures, clinical practice, policy

Date received: 14 February 2025; accepted 18 December 2025.

Background

Routine health care data are those collected during clinical practice, for reasons other than research.[1] An individual patient's data can be used locally to track their progress over time and to inform consultations and clinical decision making,[2] whereas aggregated data can be used for health care quality improvement, benchmarking, and to identify and reduce health inequalities.[3] A recent review commissioned by the UK Secretary of State for Health and Social Care highlighted the unrealized potential in National Health Service (NHS) health care data to improve quality, safety, and cost-effectiveness of care,[4] and generating an important source of information for researchers.[5] However,

---

[1] Portsmouth Hospitals University Trust and Hampshire and Isle of Wight Healthcare NHS Foundation Trust, UK

[2] University of Southampton, Southampton, UK

[3] Guys and St Thomas' NHS Foundation Trust, London, UK

[4] Royal National Orthopaedic Hospital, Stanmore, UK

Corresponding author:

Chantel Ostler, People Powered Prosthetics Research Group, School of Health Sciences, University of Southampton, Building 67, Highfield Campus, Southampton SO16 2HA, UK. Email: c.ostler@soton.ac.uk

***Associate Editor:** Jan Andrysek*

DOI: 10.1097/PXR.0000000000000527

several authors have highlighted common issues with initiatives aimed at collating routinely collected health care data, such as inaccurate data, reporting that lags behind clinical care and a lack of accessibility for clinicians.[6] Furthermore, NHS data collection has also historically focused on collection of process data such as waiting times, numbers of referrals, or clinical contacts.[3] However, outcome information is often overlooked. Such data could provide an understanding of the impact health services and interventions have on the health and well-being of patients.[3]

Despite the growing number of large-scale data collection initiatives within prosthetic rehabilitation settings across the globe, there is currently no nationwide data collection initiative in England. Past projects such as the National Amputee Statistical Database last reported in 2008 and did not include outcome information. Currently NHS England collect activity data from centers as part of the commissioning process, but it is not publicly available. Within England, Prosthetic rehabilitation is organized within 35 regional centers, which offer multidisciplinary services such as physiotherapy, prosthetic care, occupational therapy, rehabilitation medicine, nursing, and psychological support, for initial prosthetic rehabilitation after limb loss, and lifelong management. There is currently no data collection or outcome measurement (OM) consensus across these centers.

A recent narrative review highlighted many barriers to OM in prosthetic rehabilitation including time pressures and lack of training on the selection, implementation, and interpretation of such instruments.[7] Perhaps as a result, little is currently known about how English prosthetic services collect data or use OMs. This information could help realize the potential of these data in prosthetic rehabilitation and inform the development of future, nationwide, data collection initiatives.

The NHS England Microprocessor knee (MPK) policy was introduced in 2016 and sets out guidance for clinicians working in all 35 English prosthetic centers on the prescription of MPKs.[8] The policy is the sole prescription guidance for lower limb prostheses available in England and describes the only standardized approach to data collection and OM. The aim of the policy was to create an equitable, evidence-based approach to the prescribing of MPKs and improve the quality of limb loss rehabilitation and outcomes at a national level.[8] The policy was developed through the NHS commissioning process for Complex Disability Equipment and sets out the prescribing process. It outlines patient selection criteria, intended for use by the multidisciplinary health care team (MDT) during clinical assessments, and grounded in evidence of clinical efficacy and cost-effectiveness. Potentially suitable patients undergo a 4-week trial with the MPK where they are able to take the knee home and use it for daily activities. Outcome measures (including core measures and optional additional measures) should be assessed with the patients existing non-MPK before commencing the trial and must include patient-reported outcome measures. The same OMs should be repeated at the end of the trial using the MPK, for comparison. Provision of the MPK is agreed at an MDT meeting that includes the patient. Follow-up reviews are arranged at 6 monthly intervals and should include repeated OM. Table 1 describes the data collection requirements as described in the MPK policy, including OMs. Data collection was required to support national auditing by NHS England, which has yet to be undertaken.

The standardization offered by the MPK policy provides a useful framework to begin to explore how routine health care data and OMs are collected in clinical settings. Therefore, the aim of this work was to examine data collection and OM practice in English prosthetic services within the context of the MPK policy and consider lessons that might be learnt for future data initiatives and policy-making.

Methods

A national survey was conducted, considering the current data collection and OM practice undertaken in English prosthetic centers during the implementation of the MPK policy, to address the following objectives:

1. To understand types of data collected and storage arrangements.
2. To understand how OMs are implemented in clinical settings.
3. To gain insight into how data are used to inform clinical practice.

All 35 English prosthetic centers[9] provide MPKs in accordance with the NHS England MPK policy[8] and were approached to complete the survey.

Ethical approval

The Health Research Authority Decision Making Tool[10] categorized the project as a national service evaluation, and therefore, ethical approval was not required. No patient data was collected as part of the project.

Survey design

A novel survey was designed to address the study objectives (see survey, Supplementary Digital Content 1, http://links.lww.com/POI/A357). Three authors (JS, AJ, and CO) are clinicians working in prosthetic rehabilitation, a prosthetist and 2 physiotherapists. They drew on their clinical experience to develop survey questions for the following 3 sections, aligned with the study objectives:

1. Type of data collected and storage arrangements in clinical settings.Data requirements set out in the MPK policy were grouped into patient characteristics (i.e., age, sex, cause of amputation), treatment-related (i.e., number of prosthetic or physio contacts), prosthetic-related (i.e., original knee, type of MPK), and OMs (i.e., core and additional measures). Multiple-choice options were provided for each data type, including “Not recorded,” “Recorded in a centre specific MPK database,” “Recorded in the individual patients’ notes (either digital or paper),” or “Recorded in both a database and patient notes.” For the purpose of this analysis, the response of “both” was included in the “MPK database” count.
2. OM implementation in clinical practice.Respondents were asked which OMs were used and how, for example, whether walk tests were conducted inside or outside (recommended in the policy[8]), or whether they were performed using a continuous path vs. back-and-forth shuttles. It should be noted that the policy does not define specific walking tests to perform, so the survey focused on those commonly implemented in prosthetic practice

Table 1. Summary of data collection requirements described in NHS England Clinical Commissioning Policy: Microprocessor controlled prosthetic knees.[8]

Data type	Information published in MPK commissioning policy[8]
Wider data requirements	Data regarding patient numbers, demographics, levels of amputation, aetiology, and providing service centers should be collected at a national level and made available for analysis by NHS England
Core outcome measures (mandated)	- PEQ - Self-reported frequency of stumbles and falls (over the past 6 months) - Patient stumbles and falls diary to record changes - Timed walking tests (indoors and outdoors) - TUG - RNLI - Joint movement data
Additional optional outcome measures	- L test - Gait lab analysis - TUG - LCI 5 - AMP PRO - PCI - Tinetti's balance assessment tool - COPM - GAS - HAD scale - Activity balance confidence scale UK - Video evidence of gait and improved performance of functional tasks relevant to the patient's agreed goals

Abbreviations: AMP PRO, amputee mobility predictor with prosthesis; COPM, Canadian occupational performance measure; GAS, goal attainment scale; HAD scale, Hospital anxiety and depression scale; LCI-5, locomotor capabilities index 5; PCI, physiological cost index; PEQ, prosthesis evaluation questionnaire; RNLI, reintegration to normal living index; TUG, timed up and go.

and research.[11] Respondents were also asked how OM results were recorded, for example, the frequency of measurement, different OM subdomains, absolute vs. normalized scores, etc.

3. Use of data collected during implementation of the MPK policy.

Open-ended questions asked how clinicians used OM information, whether data were collated and if so, how the collated data were used, and if anything could be done to improve current OM implementation/use.

The survey was created using Microsoft Forms and piloted by 2 clinicians from different prosthetic centers. Written and verbal feedback about the content and usability of the survey was used to develop the final version.

Data collection

All centers were informed about the survey via the NHS Centre Managers Forum and professional networks. An introductory email set out the project aims and provided the survey link. Centers were asked to complete 1 survey per center. Responses were collected between November 2022 and July 2023.

Data analysis

Quantitative data collected via the survey were analyzed using descriptive statistics. Data were analyzed in the proportion of limb centers that responded (%C). Using the number of patients who were prescribed an MPK after a successful trial reported by each center, it was also possible to calculate the proportion of patients for whom data were recorded (%P), from the total number represented in this research. Each of the combinations of recording OMs and storing data were stratified in this analysis. Written responses to each of the open-ended questions were analyzed inductively using qualitative content analysis as described by Mayring[12] and summarized in Table 2.

Results

Twenty-two of 35 English NHS prosthetic centers (62.8%) completed the survey. A total of 1598 patients had undertaken an MPK trial at the participating centers. A total of 1467 patients (91.8%) accepted the MPK as their primary, everyday prosthesis. Of the 131 patients (8.2%) who did not continue with an MPK, 74.6% made the decision independently, in 13.9% of cases the decision was made solely by the MDT, and a further 11.5% were joint decisions between the patient and their MDT.

Types of data collected and storage arrangements in clinical settings

Figure 1 illustrates the frequency of data collection by data type (patient characteristics, treatment-related items, prosthetic-related items, and core OMs), across the different centers, and the storage methods reporting %C and %P. Five patient characteristics (level, side and cause of limb absence, comorbidities, and indications for MPK), and all 6 prescription-related items (prosthesis knee, foot and suspension, before and during the trial) were collected universally. All other patient data types exhibited collection rates greater than 80%, except "Hours of physiotherapy," which

Table 2. Description of content analysis process for open-ended survey questions.

Description of content analysis process
1. Each open-ended question was analyzed separately by the lead author
2. Responses were reviewed line by line and codes were formed inductively from the data until no new codes were created
3. A coding book was developed and then reviewed to check for clarity and overlap
4. Codes were reduced as appropriate and the data re-reviewed
5. Frequencies of codes were calculated for each question

presented the lowest collection rate (54.5%C, 50.7%P). Five of the 6 core OMs exhibited collection rates >90%C/>90%P. Only "joint movement data" saw lower collection rates (68.2%C, 66.5%P).

"Patient notes" was the most common storage method for all data items with only 13/22 centers collating data in a locally owned MPK database. Outcome measures were the data category most commonly stored in a database, with 5 of the 6 OMs presenting database storage rates >50%C/>50%P. "Type of MPK" was the patient data item most likely to be recorded in an MPK database (45.5%C, 41.2%P), whereas, for all other items, database storage rates were <23%C/<20%P.

The "Additional OMs" listed in the MPK policy were collected less often than the core OMs (Table 3), with the most frequently

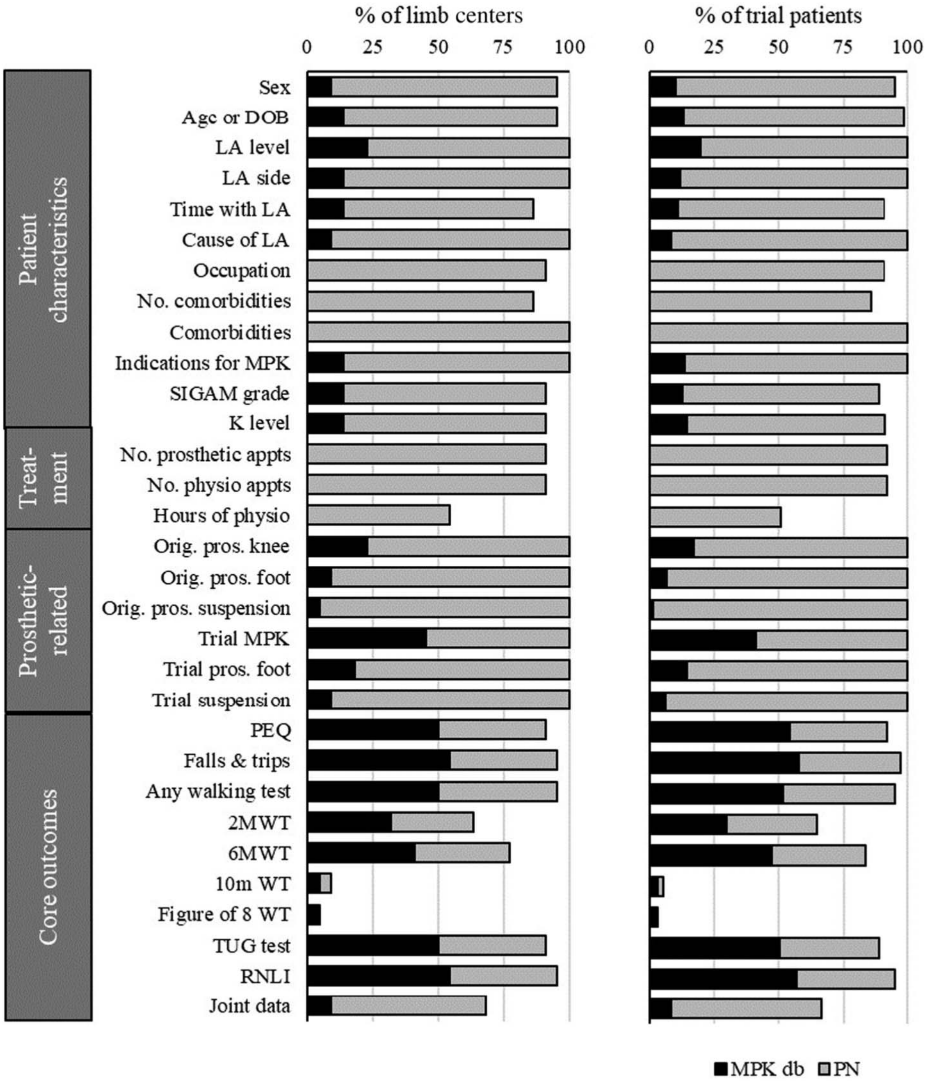

Figure 1. Patient characteristics, treatment-related data, prosthetic-related data, and core OMs that are stored in center-specific MPK databases (MPK db; black) and patient notes (PN; gray), as proportions of the total number of centers (left) and the total number of patients (right). The dashed box indicates OMs that are subcategories of the core OM "Walking tests." 2MWT, 2-minute walk test; 6MWT, 6-minute walk test; Appts, appointments; DOB, date of birth; LA, limb absence; MPK, microprocessor knee; No., number of; Orig., original e.g. pretrial; PEQ, Prosthesis Evaluation Questionnaire; Pros., Prosthetic; RNLI: Reintegration to Normal Living Index; SIGAM, special interest group in amputee mobility; TUG, timed-up-and-go; WT, walk test.

collected being Socket Comfort Score (77.3%C, 68.4%P) and EQ-5D-5L (50.0%C, 51.2%P). The least frequently collected were the Canadian Occupational Performance Measure (0.0%) and Tinetti's balance assessment tool (4.5%C, 3.9%P). Other OMs not mentioned in the MPK policy but reported as being recorded by different centers included General Anxiety Disorder 7 item scale (4.5% C, 3.3% P), heart rate (time to recovery) (4.5% C, 6.8% P), the Houghton scale (4.5% C, 3.9% P), and the Berg Balance scale (4.5% C, 1.2% P).

OM implementation in clinical practice

Across the 22 centers, there was variation in the implementation and recording of OMs. In patient-reported OMs, most centers (77.3%C, 77.4%P) collected all the subdomains of prosthesis evaluation questionnaire, but some (13.6%C, 14.5%P) only recorded specific subdomains. For falls and trips, "per month" was the most frequently used reporting method (45.5%C, 43.2% P), followed by "per week" (31.8%C, 27.8%P). For the Re-integration to Normal Living Index, the adjusted score (40.9%C, 45.4%P) was more likely to be documented than the total score (36.4%C, 34.1%P), with few centers recording both (18.2%C, 15.7%P).

Figure 2 shows the variability in walking tests protocols. There was high consistency in the conduct of walking tests on occasion indoors (90.9%C, 90.0%P) and on flat, level ground (90.9%C, 90.0%P). However, the decision to perform walking tests outside was less consistent (31.8%C, 35.2%P), whereas 27.3%C (27.2% P) sometimes perform the tests on variable walking surfaces (e.g., grass, slopes, etc.). All of the centers that sometimes performed tests outside or on variable surfaces also said they sometimes performed the tests inside, on level ground. Walking aid use during these tests was recorded by 90.9%C (78.7%P).

The 2-minute walk test (2MWT; 63.6%C, up to 64.8%P) and 6-minute walk test (6MWT; 77.3%C, up to 83.3%P) were the most commonly implemented, with only 9.1%C (5.5%P) and 4.5%C (3.1%P) recording the 10-m and the figure-of-eight walk tests, respectively. The most common technique used for the timed walking tests was to ask the patient to walk back-and-forth between 2 points, with 180 degree turns at each end (77.3%C, 82.6%P). A planned circuit within the center was used by only 27.3%C (18.2%P). Two-thirds of centers that used a circuit also used the back-and-forth technique (18.2%C, 11.2%P). No information was provided about the length of these circuits. In addition, two-thirds of those that used a circuit reported that the direction of travel of their circuit was consistent across all patients (18.2%C, 14.7%P).

Use of data collected during implementation of the MPK policy

Responses collected via the final open-ended questions (Table 4) demonstrated that OM data were most often used at the individual level to inform the MDT of a patient's suitability for MPK prescription after the trial (95%). Two centers (9%) reported using baseline outcome information to prioritize patients for MPK provision. In addition, 5 centers (23%) commented that falls rates, collected using self-reported falls diaries as suggested in the MPK policy,[8] were the most useful outcome to inform decision making.

Data collation across patients occurred in 59%C. Of these, data were used for audit, evaluation, and research (46%), to direct changes in practice (23%) or to inform managers (8%).

Table 3. The rates of data collection of the additional OMs listed in the NHS England MPK Clinical Commissioning Policy,[8] reported by proportions of limb centers and by the proportions of patients.

Outcome measures	Rate by center (%C)	Rate by patient (%P)
Socket comfort score	77.3	68.4
EQ-5D-5L	50.0	51.2
ABC scale	40.9	36.3
HAD	36.4	34.8
Heart rate	36.4	31.0
LCI 5	27.3	23.2
EQ-VAS	22.7	25.1
L test	22.7	21.2
PHQ-9	22.7	19.4
O_2/VO_2/CO_2	18.2	14.5
PCI	18.2	16.6
AMPpro/AMPnopro	9.1	7.6
GAS	9.1	3.5
PLUS-M	9.1	6.3
Tinetti	4.5	3.9
COPM	0.0	0.0

Abbreviations: ABC, activity-specific balance confidence; AMPpro/AMPnopro, Amputee Mobility Predictor (with/without a prosthesis); COPM, Canadian Occupational Performance Measure; EQ-5D-5L, EuroQoL 5-dimensions 5-levels; EQ-VAS, EuroQoL Visual Analogue Scale; GAS, Goal Attainment Scale; HAD, hospital anxiety-depression; LCI, locomotor capability index; PCI, Physiological Cost Index; PHQ, Patient Health Questionnaire; PLUS-M: Prosthetic Limb User Survey—Mobility scale; Tinetti, Tinetti's balance assessment tool.

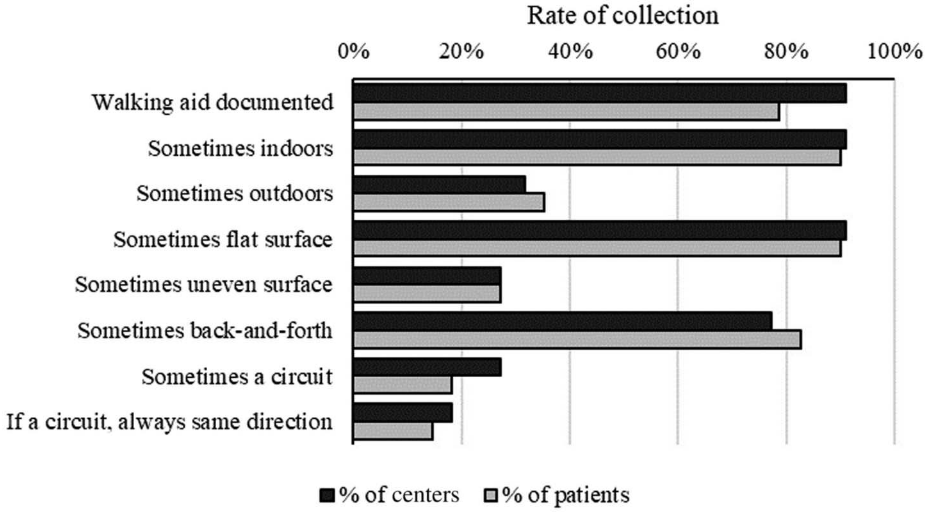

Figure 2. The rates of respondents answering "True" to questions about different walking test implementation methods.

About potential improvements, the most commonly reported suggestions were to ensure OMs were relevant and useful for decision making (50%), to develop digital solutions to data collection (45%), to collate data nationally for comparison (36%), and to minimize data collection so it is less time consuming for clinicians (32%).

Table 4. Summary of open-ended survey questions and associated codes, with coding frequency by center.

Survey question and associated codes	Frequency of coding
How do you use outcome measurement information to support your decision to prescribe an MPK, or not, after the trial?	
C1: To inform the MPK prescription decision	21/22
C2: To identify if the patient has achieved their goals	4/22
C3: To prioritize or select patients to take part in an MPK trial	2/22
C4: To allow an objective comparison making decision more holistic	4/22
C5: Not all measures are useful to support decision making	5/22
C6: The number of recorded falls is the most useful domain	5/22
C7: Benchmarking and use at service level for normative comparison	1/22
If you collate your MPK information, how do you evaluate it or use it to inform your service improvement work?	
C1: MPK data collated	13/22
C2: MPK data not collated	9/22
C2: Collated and used to guide audit, evaluation, and research	6/22
C4: Collated to inform practice development	3/22
C5: Collated but no details about use	4/22
C6: Collated to inform managers	1/22
What do you think could be done to make outcome measurement easier or more useful to your service or patients?	
C1: Outcome measurement relevant and useful for decision making	11/22
C2: Collate nationally for comparison	8/22
C3: Develop digital solutions	10/22
C4: Minimize data collection	7/22
C5: More staff available	3/22
C6: Develop standardized process	3/22
C7: Accessible reporting	2/22

Discussion

This nationwide survey of English lower limb prosthetic services was designed to elicit information to address the 3 study objectives.

Objective 1: data collection and storage

The first objective was to understand the type of data collected and how it is stored. The results indicated that there was high consistency in the types of data that were collected across centers.

The NHS England MPK Policy[8] stipulates which OMs to collect, so uniformity in this regard may be expected. However, there was a broad disparity in the collection rates of the optional OMs (Table 3). This is likely linked to the time pressures on staff, which was emphasized in the open-ended questions, and suggests prioritization of only the most useful measurements in future policies.

Although the policy stipulates which OMs must and might be used, it does not clearly outline a minimum dataset for other data categories (patient characteristics, treatment-related, prosthetic-related). Consistency of data collection across different centers in these latter categories demonstrates an understanding within the prosthetics field and acknowledgement of the importance of these data types. A recent International Society of Prosthetics and Orthotics (ISPO) initiative—the Lower Extremity Absence Data, or LEAD—sought to gather expert opinion and define a core dataset "useful to industry, implementers, and policy makers."[13] Many of the types data consistently collected in English prosthetic centers align with the recommendations of the LEAD project.[11]

Despite consistency, these data were not always readily accessible to clinicians, often recorded in individual patients' notes, rather than a collated database, which limits use of the data for health care quality improvement and research. The MPK policy[8] does not stipulate a method of data storage or collation, which may have led to heterogeneity between centers. In Section 10 (Audit Requirements), the Policy[8] states that a web-based system for data entry is planned, but to the authors' knowledge, this has not yet been implemented.

Objective 2: OM implementation

The second objective was to understand how OMs are implemented in clinical settings and a high degree of variation between centers was observed (Figure 2). An important aspect of OM, especially when collating and comparing data for health care quality improvement or benchmarking across multiple sites, is the validity and reliability of the chosen instrument, which encompasses not only the measurement tool but also how it is administered.[14] Survey responses demonstrated variation in the use of patient-reported OMs and performance-based measures, particularly walk tests. Differences in the walking surface (e.g., hard floor vs. grass), test direction (e.g., back-and-forth vs. circuit), test location (e.g., indoors vs. outdoors), and presence of environmental factors (e.g., busy areas, weather conditions) etc., were reported both between centers and within centers. Varying test conditions can alter the underlying concept being assessed and introduce variability in measurement, which can make the data less reliable for assessment and scientific research.[15] This could be particularly relevant to people with limb loss who's walking speed would be affected by whether they turned 180 degrees toward or away from their amputated side. It may be argued that the policy document is not sufficiently detailed when it comes to OMs as no information is provided about how tests should be performed or references provided for the measures.[8] This may also demonstrate a need for greater education for clinicians concerning the use of OMs in practice, which has been highlighted elsewhere.[7,16,17] These 2 observations could be important learning points for future policy development and implementation.

Objective 3: data usage

The third objective was to gain insight into how data are currently used to inform prosthetic clinical practice. The collection and use of data is very topical, having been identified as a recurring theme at educational meetings in the field.[18] Most centers (95%) described using OM data (collected before the trial using the non-MPK and after the trial using the MPK) to inform individual-level decision making regarding MPK provision, based on whether the patient demonstrated improvement in scores. Information about changes in self-reported falls rates (collected using falls diaries) were described by clinicians as most useful to guide prescription decisions. Notably, prior research has shown that the prescription of MPKs significantly reduces fall rates compared with non-MPKs.[19,20] However, many comments were made about the relevance of OMs, as well the associated time burden of data collection. These issues have been reported elsewhere within prosthetic rehabilitation[16,17] and wider health care settings[21] and have been described as barriers to the practice of OM, which is meaningful for clinical practice.[7] Additional challenges for using OMs in this way include potential bias introduced by patients self-reporting falls or completing patient-reported outcome measures to evaluate a knee they desire, and the lack of minimally clinically important difference values for many of the recommended OMs, making it difficult to determine whether meaningful improvements have been achieved.

There was some evidence of service level use of data for audit, evaluation, and improvement; however, 41% of centers did not collate data. Given that over 90% of the centers in this study routinely collected data, it suggests a significant untapped potential within prosthetic services for evaluating care—a concern underscored in a recent review commissioned by the UK Government's Secretary of State for Health and Social Care.[4] Future research could focus on what is required to support prosthetic rehabilitation clinicians to collect and use data in a meaningful way.

Limitations

The main limitation of this work was that feedback was only provided by 63% of English prosthetic centers. Although data came from a variety of service providers, geographical locations, and center sizes, it is not clear whether the findings represent data collection practice across the whole of England. Second, the survey findings were reported by prosthetic services themselves. The authors had no access to actual data to check for potential reporting errors. Third, multiple choice survey design may have limited feedback from centers and led to missing information, where a relevant response option was not included. For example, the survey did not gather information on how frequently the patients were assessed with OMs. Finally, the survey only asked if the optional OMs were recorded and not how. Some of the optional OMs (e.g., EQ-5D-5L) can be recorded in different ways, leading to further potential intercenter variability.

Implications for future policy and data collection initiatives

Overall, the survey findings indicate the MPK policy has been largely successful, with 91.8% of patients continuing with their MPK after the mandated trial period, helping to provide evidence for the continuation of provision. To the authors' knowledge, these are the first available data regarding the acceptance/rejection rate of MPKs under this policy.

Several lessons could be learnt for development and implementation of future policy or data collection initiatives within prosthetic rehabilitation. These insights are particularly relevant in light of the growing global effort to develop registries in prosthetic rehabilitation,[22-24] especially given ongoing concerns about whether large-scale data collection initiatives can truly reach their full potential and demonstrate meaningful impact for patient outcomes.[6] Gaining insights from current data collection in practice, such as within the framework of the English MPK policy, could inform development of future policy or data collection initiatives to ensure they are fit for purpose. Findings from this study clearly indicate the need for explicit data collection requirements, especially around OM. Well-defined information is required not only about which OMs but also the measurement and reporting processes, to standardize what data are collected and how. This would enable data within and across centers to be aggregated or compared with scientific validity and reduce the risk clinical decisions, health care quality improvement, or research being based on inaccurate information. Second, considering clinical time-pressures, initiatives/policy should prioritize only the most relevant outcomes that aid clinical decision making. Engagement with different stakeholders, especially clinicians and patients, could help identify which outcomes are most important, especially for those living with limb loss.[25] Standardized IT systems should also be employed to aid data collation and reporting, providing clinical teams with access to data at a local level to enable health care quality improvement and research activity. Considering well-documented time issues in clinical practice, solutions may need to be accessible, intuitive, and integrated with patient records to reduce duplication of effort.

These findings may indicate an appetite within NHS prosthetics services for greater collation of data to inform health care quality improvement, such as a nationwide data collection initiative, which could also be a useful resource for evaluating future policy initiatives. However, as described previously, issues raised within this study may need to be considered for any planned initiative, such as the prioritization of meaningful data collection and standardization of measurement processes. Education for clinical teams could also be incorporated to reduce variation and improve data quality and value.

Conclusion

The consistency of types of data captured demonstrate the importance of these data for implementation of the NHS England MPK policy. This work has identified several areas of variability that present operational and educational challenges for the clinical use of health care data and OMs. These challenges need to be considered for those implementing future policies or aiming to develop large-scale data collection initiatives in prosthetic rehabilitation.

Ethics Review and Approval

The author(s) disclosed ethics review and approval for the research described in this article: The Health Research Authority Decision Making Tool (https://www.hra-decisiontools.org.uk/ethics/) was used to identify whether this project required ethical approval. The tool categorized the project as a national service evaluation, and therefore, ethical approval was not required. No patient data was collected as part of the project.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Dr Alex Dickinson received a global challenges research grant from the Engineering and Physical Sciences Research Council and a research fellowship from the Royal Academy of Engineering.

Declaration of conflicting interest

The author(s) disclosed the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: C.O. has nothing to disclose. M.M. has nothing to disclose. A.J. has nothing to disclose. J.S. has nothing to disclose. A.D. reports grants from Engineering and Physical Sciences Research Council, grants from Royal Academy of Engineering, during the conduct of the study.

ORCID iD

C. Ostler: https://orcid.org/0000-0002-8267-2892

Supplemental material

Supplemental material for this article is available in this article. Direct URL citation appears in the text and is provided in the HTML and PDF versions of this article on the journal's Web site (www.POIjournal.org).

References

1. Nicholls SG, Langan SM and Benchimol EI. Routinely collected data: the importance of high-quality diagnostic coding to research. *CMAJ* 2017;189: E1054–E1055.
2. Basch E. Patient-reported outcomes: harnessing patients' voices to improve clinical care. *N Engl J Med* 2017;376:105–108.
3. Devlin NJ, Appleby J and Buxton M. *Getting the Most out of PROMs: Putting Health Outcomes at the Heart of NHS Decision-Making*; London: The King's Fund; 2010. [cited 2020 Jan]. www.Kingsfund.org.uk
4. Goldacre M. Better, Broader, Safer: *Using Health Data for Research and Analysis. 2022. A Review Commissioned by the Secretary of State for Health and Social Care*. London: Dept of Health and Social Care.
5. Sydes MR, Barbachano Y, Bowman L, Denwood T, Farmer A, Garfield-Birkbeck S, et al. Realising the full potential of data-enabled trials in the UK: a call for action. *BMJ Open*. 2021;11(6):e043906.
6. Nelson EC, Dixon-Woods M, Batalden PB, Homa K, Van Citters AD, Morgan TS, et al. Patient-focused registries can improve health, care and science. *BMJ*. 2016;354:i3319.
7. Ostler C, Scott H, Sedki I, Kheng S, Donovan-Hall M, Dickinson A, et al. From outcome measurement to improving health outcomes following

lower limb amputation: a narrative review exploring outcome measurement from a clinical practice perspective. *Prosthet Orthot Int*. 2022;46(4): e341–e350.

8. NHS England *Specialised Services Clinical Reference Group for Complex Disability Equipment-Prosthetics. Clinical Commissioning Policy: Microprocessor Controlled Prosthetic Knees (Reference: NHS England: 16061/P)*. London: NHS England; 2016. [cited 2024 Apr 12]. Available from: https://www.england.nhs.uk/wp-content/uploads/2016/12/clin-comm-pol-16061P.pdf
9. NHS England. *Prosthetics Review*. London: NHS England;[cited 2025 May 25]. Available from: https: //www.england.nhs.uk/prosthetic-service-specification.pdf.
10. HRA Decision Tools. London: Health Research Authority; [cited 2024 Apr 12]. Available from: https://www.hra-decisiontools.org.uk/ethics/
11. Tan JM, Halford GR, Lukin M and Kohler F. Recommendations from the ISPO lower-limb COMPASS: patient-reported and performance-based outcome measures. *Prosthet Orthot Int* 2023;47:13–25.
12. Mayring P. Qualitative content analysis. In: *International Encyclopaedia of Education*. 4th ed. Vol 12; 2023.
13. Kohler F. LEAD and COMPASS: tools to map the way forward for people with lower limb absence. *Prosthet Orthot Int* 2021;45:369–372.
14. de Vet HCW, Terwee CB, Mokkink LB and Knol DL. *Measurement in Medicine: A Practical Guide*. New York: U.S.A.: Cambridge University Press; 2011.
15. Beekman E, Mesters I, Hendriks EJ, Klaassen MP, Gosselink R, van Schayck OC, et al. Course length of 30 metres versus 10 metres has a significant influence on six-minute walk distance in patients with COPD: an experimental crossover study. *J Physiother*. 2013;59(3):169–176.
16. Hafner BJ, Spaulding SE, Salem R, Morgan SJ, Gaunaurd I and Gailey R. Prosthetists' perceptions and use of outcome measures in clinical practice: long-term effects of focused continuing education. *Prosthet Orthot Int* 2017;41:266–273.
17. Gaunaurd I, Spaulding SE, Amtmann D, Salem R, Gailey R, Morgan SJ, et al. Use of and confidence in administering outcome measures among clinical prosthetists: results from a national survey and mixed-methods training program. *Prosthet Orthot Int*. 2015;39(4):314–321.
18. Spaulding SE, Utay JB and Sachs SN. Recurring themes in prosthetic and orthotic education: a narrative review of prosthetic and orthotic education summit meetings. *JPO J Prosthetics Orthot* 2023;35:139–148.
19. Sawers AB and Hafner BJ. Outcomes associated with the use of microprocessor-controlled prosthetic knees among individuals with unilateral transfemoral limb loss: a systematic review. *JPO J Prosthetics Orthot* 2013;25:P4–P40.
20. McGrath M, Gray LA, Rek B, Davies KC, Savage Z, McLean J, et al. Can microprocessor knees reduce the disparity in trips and falls risks between above and below knee prosthesis users? *PLoS One*. 2022;17:e0271315.
21. Duncan EA and Murray J. The barriers and facilitators to routine outcome measurement by allied health professionals in practice: a systematic review. *BMC Health Serv Res* 2012;12:96.
22. Kaufman K, Bernhardt K, Murphy S, Archer M, Brandt JM, Bowman L, et al. Creation of a limb loss and preservation registry for improving the quality of patient care in the United States. *Arch Rehabil Res Clin Transl*. 2024;6(3):100356.
23. Kamrad I, Söderberg B, Örneholm H and Hagberg K. SwedeAmp—the Swedish Amputation and Prosthetics Registry: 8-year data on 5762 patients with lower limb amputation show sex differences in amputation level and in patient-reported outcome. *Acta Orthop* 2020;91:464–470.
24. Alimusaj M, Michel K, Block J, Daub U, Heitzmann D, Nguyen TD, et al. Update of the Amputation Registry Germany (AMP-Registry). *Unfallchirurgie*. 2025;128(4):240–247.
25. Ostler C, Donovan-Hall M, Dickinson A and Metcalf C. Exploring meaningful outcome domains of recovery following lower limb amputation and prosthetic rehabilitation: the patient's perspective. *Disabil Rehabil* 2023;45:3937–3950.