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RESEARCH ARTICLE

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Stroke rehabilitation in coastal Eastern England: a qualitative study of intersectional inequalities

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ABSTRACT

Purpose: Disparities in stroke incidence, outcomes and access to healthcare are increasingly reported—including in relation coastal status—yet a health-systems perspective is rarely applied to examine root causes. This study utilises a health-systems approach to explore how rehabilitation models of care may exacerbate or mitigate health inequalities, in an organisation serving rural and coastal communities in England.

Methods: A multi-faceted theoretical framework drawing on seminal health-systems concepts was derived, to guide this qualitative study. Focus group discussions with stroke professionals were conducted. Data were analysed thematically, and iteratively, *via* operationalisation of the theoretical framework.

Results: Rehabilitation systems exacerbated health inequalities, which was related to unresponsiveness to personal and social determinants, geographical factors and system-level factors. Bottlenecks were identified in accessibility and effective health coverage, which were associated with multiple aspects of a health system, including service delivery, financing, workforce, health information systems and leadership/governance. Four recurrent intersectional high-risk profiles emerged.

Conclusion: There are significant, system-derived challenges in the current stroke rehabilitation and life-after-stroke provision in the region studied, which may exacerbate health inequalities for those who are already marginalised by society. Applying an intersectional framework to develop solutions for equality in rehabilitation systems is required.

➤ IMPLICATIONS FOR REHABILITATION

- In England, stroke rehabilitation is delivered via the publicly funded national health service (NHS) which is mostly free at the point of use for all residents, centring equity.
- Stroke rehabilitation systems should be commissioned, designed and implemented according to patient needs and local population characteristics, with explicit attention to the intersections of coastal and socio-economic deprivation and across multiple axes including, transport barriers, cultural and linguistic diversity and disability status across the lifespan.
- Improving the quality and collection of patient data is an important step in enabling intersectional analyses for understanding interactions between patient and population characteristics, needs and outcomes which can inform the design of equitable systems.

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Stroke; rehabilitation; health inequalities; health system assessment; intersectionality

Introduction

Burden of stroke and stroke rehabilitation

Globally, stroke ranks as the third leading cause of combined death and disability, and its incidence is increasing [1,2]. Advances in early detection and treatment now mean that more people than ever survive

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stroke. As a result, an increasing proportion of the population lives with its chronic consequences, which are often severe and lifelong, including motor, cognitive, sensory, medical, and communication difficulties [3]. The World Health Organisation (WHO) estimates that more than 160 million years of healthy life are lost annually due to stroke-related death or disability worldwide [1]. In the United Kingdom (UK), stroke accounts for three-quarters of deaths attributed to cardiovascular disease, and 1.3 million people are currently living as stroke survivors [4]. Although evidence remains somewhat inconsistent concerning optimal formats and timing for rehabilitation [5], there is global consensus that stroke rehabilitation is an essential health service that should be accessible to all [6]. Overall, evidence supports that rehabilitation [7] enhances independence and health-related quality of life across multiple functional domains [8,9]. Nevertheless, outcomes vary considerably depending on factors such as the level of functional disability at hospital admission and associated stroke-related impairments, including communication difficulties [10].

Underperformance of rehabilitation services

Despite strong imperatives and extensive guidance promoting best practices in stroke rehabilitation [11–13], UK stroke rehabilitation services continue to fall short in adequately serving this population [14]. This trend is mirrored internationally across high-, middle-, and low-income settings [15,16]. In the East of England, the persistent inconsistency in the quality and availability of stroke rehabilitation has been documented, and the quality and availability of stroke rehabilitation has been repeatedly highlighted, first in a 2006 report [17] and confirmed through subsequent audits up to 2021 [14]. A more recent evaluation reinforced these findings, revealing enduring disparities in access to rehabilitation [18]. These shortcomings are multifactorial, context-dependent, and require systematic investigation.

Inequalities in stroke care

Health inequalities are avoidable but systematic differences in health, access to care, and outcomes across different population groups. In Western healthcare, attention has focused on disparities disproportionately affecting racialised and other marginalised groups [19–21]. In the UK, the Chief Medical Officer (CMO) has specifically highlighted poorer health outcomes and wellbeing in coastal areas compared to urban regions [22]. Although research on stroke-related health inequalities remains limited [23,24], some UK-based studies reveal socio-economic disparities in stroke incidence, care, and mortality [25,26]. Other inequalities affecting post-stroke outcomes have been linked to race, ethnicity, gender, age, and socio-economic status [27–29]. Although some inequalities relate to individual factors, broader social determinants such as geographic context play a crucial role. The CMO's report identified stroke as particularly vulnerable to a 5.25% "coastal excess" burden [22], yet stroke in coastal communities remains under-researched [24]. Intersectionality, which considers how overlapping social identities shape access to health care, is increasingly necessary in examining these disparities [30], to reveal previously overlooked inequities and better identify individuals facing compounded disadvantages. Despite growing recognition and calls for further study, systematic assessments of how publicly funded stroke systems contribute to stroke-related health inequalities remain scarce.

Stroke service governance in England

Stroke care in England is mostly delivered *via* the National Health Service (NHS), a publicly funded healthcare system, providing comprehensive medical and health care that is largely free at the point of use to all residents. Engrained in its constitution is the core value of "*everyone counts*," which emphasises a commitment to equity [31]. The configuration of the NHS's stroke care is guided by the National Stroke Service Model (NSSM) [33]. This model is implemented by regional Integrated Stroke Delivery Networks (ISDNs) and underpinned by national clinical guidelines, which outline expectations for care content and quality [12,32]. The NSSM adopts a pathway-based framework, dividing care into five domains: prevention, urgent care, acute care, rehabilitation, and long-term support. Rehabilitation is further elaborated under the Integrated Community Stroke Service (ICSS), which emphasises out-of-hospital care, multidisciplinary access and ongoing needs-based support.

ISDNs are tasked with planning, coordinating, and overseeing local stroke care in alignment with the NSSM and ICSS. They operate as decentralised governance units, responsible for service delivery, transformation, resource allocation, and workforce planning [33]. This structure positions ISDNs as a *health system for stroke*, which is responsible for achieving universal health coverage (UHC) [34], i.e., ensuring the rights of all to access to health services and treatments, without discrimination nor imposed financial barriers or hardships.

Policy responses to health inequality

National health policy in England acknowledges the importance of addressing inequality. The most recent 10-Year Health Plan directly critiques the NHS for previously "boosting inequality" [35]. It proposes multiple reforms across prevention, care quality, and access, as well as systemic changes. Nonetheless, similar goals were stated in the 2019 NHS Long Term Plan [36], raising some doubts about policy impact. Produced between these two plans, one notable policy—the Core20PLUS framework [21]—prioritises action for socio-economically disadvantaged and marginalised populations, such as ethnic minorities and people with disabilities. Local Integrated Care Systems (ICSs) are charged with implementing Core20PLUS, and some evidence exists of its operational use in research and audit [37–40]. However, practical guidance on implementation remains limited. Likewise, although the CMO's report on coastal health inequalities outlines multiple calls to action, it lacks a clear operational strategy.

In relation to stroke specifically, in the NSSM and ICSS frameworks, health inequalities are acknowledged, but guidance on implementation is vague. Stroke is identified as subject to coastal inequalities, yet no direct mechanisms to address this are provided [22]. Ultimately, policy rhetoric appears to place the burden of change on ISDNs and local organisations. Understanding current stroke system operations is critical for translating policy into effective action.

Limitations of current evaluation tools

Global stroke service evaluations largely focus on clinical performance indicators [41]. In England, the Sentinel Stroke National Audit Programme (SSNAP) scores hospitals based on metrics such as diagnosis speed, mortality, and rehabilitation provision. While some studies have used SSNAP data to explore inequality [25], such tools rarely capture organisational, systemic, or social determinants—including intersectional influences. Given the situatedness of the ISDNs, as mentioned, evaluating them through a *health system* performance assessment (HSPA) lens could offer richer insights into the roots of inequity and guide more informed policy reform.

Study significance and originality

Stroke rehabilitation and life-after-stroke support represents a significant and growing challenge for health systems. It is also marked by considerable inequality—by incidence, service access, outcomes, and regional variation. Although policy frameworks in England acknowledge these disparities, they offer few practical solutions. Scholarly literature rarely examines the interaction between stroke rehabilitation, inequality, and the components of the health system. This study addresses that gap through a systems-level analysis, aimed at identifying barriers and proposing meaningful reforms.

This research forms part of an innovative collaboration between a university and a local NHS organisation. To the authors' knowledge, it is the first in-depth evaluation of inequality across a specific clinical pathway—stroke—using a health systems and intersectional perspective. The broader project evaluates the entire stroke pathway in alignment with NSSM; this paper focuses specifically on rehabilitation and long-term support. Other components (e.g., prevention, acute care, transient ischaemic attack (TIA) management) are reported elsewhere.

Study context

This study is situated in the stroke services provided through the East Suffolk and North Essex Foundation Trust (ESNEFT), an NHS organisation in England that provides free healthcare to residents within its

designated catchment area. These communities are on the Eastern coast of England, which experience a 5.25% higher stroke burden [22] and where marginalised groups—such as those with limited English proficiency (5.1% of the Suffolk and North East Essex population), minority ethnic backgrounds (6.9%), individuals living alone (31.2%), and those in deprived areas (10%) [42]—face disproportionate risks of adverse health outcomes and economic exclusion. ESNEFT also services the most deprived neighbourhood in England (Jaywick) and has an increasing ageing population [43]. The social factors and ramifications of these on health and access to services position the ESNEFT region as one of urgent research attention, given the potential impact of these social determinants.

Research questions

For this component, which addresses the significant research gaps outlined above, the research questions are:

> What are the perceptions of the stroke rehabilitation workforce regarding whether the current stroke rehabilitation system is providing and delivering equitable services to all who need it?
>
> If equality is not being achieved, which specific areas or aspects of the system are perceived to contribute to these inequalities?
>
> If equality is not being achieved, are there specific demographic profiles that are disproportionality disadvantaged by system-derived challenges, and what are these?

The study herein is reported in line with the Consolidated criteria for reporting qualitative research (COREQ) guidelines [44]. Reporting addresses the three COREQ domains: researcher characteristics/reflexivity, study design (sampling, setting, data collection), and analysis/findings (coding, derivation of themes, participant checking).

Materials and methods

Study design

We adopted a phenomenological qualitative design to explore the lived experiences of the workforce within the stroke system [45]. This involved undertaking of eight focus groups with the same participants, conducted in series, through a singular workshop, data from which were analysed thematically, and from the purview of key theoretical frameworks. These are introduced below, and subsequent sections outline their operationalisation in both data collection and analysis more specifically.

Theoretical frameworks

Rationale: stroke services as a health system

Though the NHS is publicly financed, autonomy in many financial respects is devolved to either to specialist areas (such as ISDNs for stroke) and/or the local governance structures who make such system-level decisions in providing health care coverage (though using the NHS is still always at no cost). Actual infrastructure, workforce and services may vary by region, as per the decisions of the ISDN, but under the guidance of the NHS Stroke RightCare toolkit [46]. In many ways stroke care in the UK, through the ISDN, operates as a "micro" health system. Health systems approaches are valuable not only to produce findings that can help direct policy, but also specifically in unveiling and addressing health inequalities [47].

To support the health-system approach that we sought to employ, the study was guided by two seminal concepts in health systems analysis, strengthened by NHS guidance on stroke services, and emergent theory on intersectional determinants of health. Together, these informed the multi-faceted theoretical framework in which the study was designed and data were collected and analysed. These are introduced in turn, below, but their application is discussed more specifically in subsequent sections. The theoretical frameworks are summarised in Figure 1.

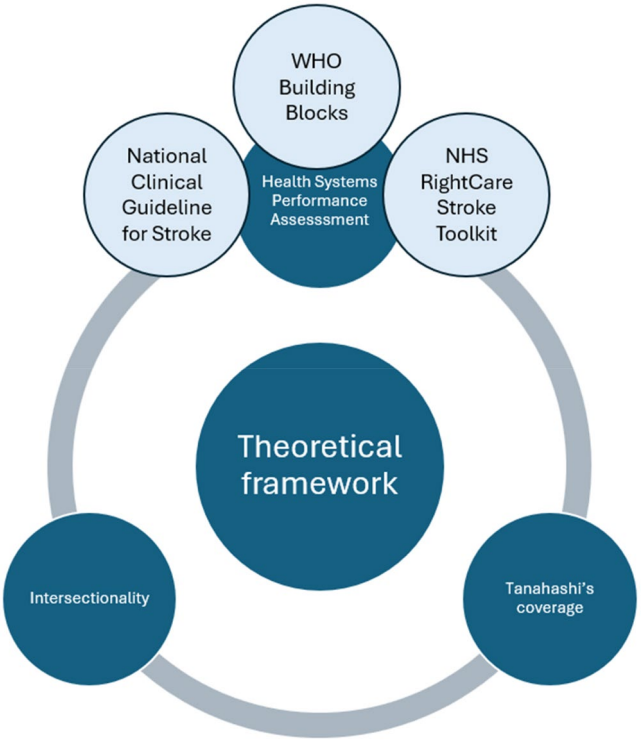

Figure 1. Multi-faceted theoretical framework derived to guide the study.

Theoretical framework 1: health system performance assessment (HSPA)

Following a review of health system performance assessment (HSPA) approaches in relation to how they adequately captured key domains of equity and service delivery, we selected to utilise the WHO's "Building Blocks" framework [48] to guide this study. This framework describes a health system as comprising "all the organisations, institutions, resources and people whose primary purpose is to improve health." [48]. Whilst there is no stroke-specific health system evaluation tool, the NHS has delivered the RightCare Stroke toolkit, a document outlining "system improvement priorities" across the stroke pathway to support local health systems. In addition, the National Clinical Guideline for Stroke for the UK and Ireland outlines service delivery expectations [11]. These national documents provided context to make sense of the "Building Blocks", within the stroke-specific health system. We drew on the domains provided in all three frameworks to produce a stroke-specific HSPA framework. For example: the "Building Blocks" captures "Workforce" as a critical foundation for a health system, but the Rightcare toolkit is needed to specify what this should look like for the stroke rehabilitation workforce. Further enriching this, the National Clinical Guideline for stroke indicates specific competencies that are expected of the workforce. This multi-layered approach allowed for development of rich and contextually relevant understanding of the stroke system. Operationalisation of this framework is detailed under "data collection."

Theoretical framework 2: Tanahashi's health coverage

The second crucial concept is Tanahashi's description of health service coverage, being the product of five types of coverage: availability, accessibility (including financial), acceptability, contact and effectiveness [49]. Effective coverage is achieved thereby when all those who need services, receive it, and it is of sufficient quality for them to gain from it. This concept enables differentiation of the *effects* of a health system on target population.

Theoretical framework 3: intersectionality

The project design was rooted in an intersectional approach [50]. In particular, we utilise intersectional framing to help make sense of our findings, premised on the notion that social categories – and importantly, intersecting social categories – are entwined with pervasive power structures that exist which

systemically enable exclusion and oppression. In this regard, we consider how the stroke system is complicit in this and seek to assess in our findings the ramifications of this on population groups.

Participants

As we were seeking a systems-level evaluation of inequality, we sought to involve key stakeholders across the stroke system. Health and social care professionals and leaders involved in the stroke rehabilitation and long-term support pathway in the local area were invited to participate in the study. Stakeholder mapping and subsequently forming relationships early on in the study was a priority, and so some relationships had already been established with organisations.

Sampling and recruitment

To guide our sampling approach, a systematic stakeholder mapping exercise of organisations and professional teams relevant to stroke rehabilitation in the local area was undertaken. Either targeted employees or generic contact points for stakeholders were approached *via* email, which contained information about the research opportunity and a request to share with relevant staff. Stakeholder groups encompassed health and social care. In England, the remit of local NHS organisations includes providing care to manage and treat medical and health conditions. The local councils provide adult social care, which includes home-care and support to live independently. In addition, both the NHS and local councils may choose to commission organisations to provide that service, including independent businesses or charities. Stroke survivors therefore come into contact with a number of agencies and sectors, which were considered in our sampling. This included the local NHS organisation (for example, approaching stroke service managers), the local council (for example, approaching social care departments), third sector stroke groups and community health initiatives. Partnership working with the local NHS organisation enabled a targeted approach to contact specific stroke workforce roles *via* known and existing professional contacts.

Participants were included if their substantive role was in any way associated with working with people living with stroke, beyond the acute hospital stage. We sought to prioritise the inclusion of representatives from all relevant stakeholder groups involved in the local health system but specifically stroke rehabilitation and long-term support. As such, the sampling method was convenience sampling, though a systematic approach to involving diverse stakeholders was made (for example, ensuring representation from health, social and charitable sectors). Because our aim was to capture the perspectives of organisations involved in stroke rehabilitation and long-term support, we pursued institutional saturation—adequate representation across relevant organisations and roles—rather than statistical generalisation. We therefore did not pre-specify a numeric sample size; recruitment continued until coverage was achieved across health, social care, and third-sector stakeholders.

Ethical considerations

In line with the Declaration of Helsinki and institutional procedures, the study received ethical approval from the University of Essex Committee (ETH2223-2340). All participants consented to involvement. The HRA has advised that this work constitutes a service evaluation rather than a research study and therefore does not require HRA ethics approval. Registration with the NHS Clinical Outcomes Team: TW25-006.

Data collection

To guide our data collection across the whole project, we used the HSPA framework (described previously) as a topic guide (provided in supplementary materials). This intended to prompt discussion on a range of health-system components, and included stroke-specific national requirements where relevant, for example, workforce, service delivery and information technology. For this study, we extracted the "rehabilitation and life after stroke" elements as the topic guide for our focus groups discussions (FGDs). A draft version of the topic guide was shared with stakeholder experts to validate the content and

ensure it reflected the domains relevant to describing systemic factors affecting equity and performance in rehabilitation.

Prior to the FGDs, the topic guide was shared with participants to prime their reflection on the elements listed. Both in advance of and within the FGDs, participants were invited to consider their views on how the stroke system was performing in each area, as well as whether they associated any of the items as pervaders of inequality. While discussion was probed for all items, it was intended that there be more extensive discussion on areas where collectively participants most felt the system to be either underperforming on, or which was an aspect producing inequality. This approach enabled in-depth, interactive discussions among stakeholders, enabling comprehensive, multi-perspective data collection.

All FDGs took place on the same day, through a face-to-face workshop in a university building; each FGD was conducted with the same participant group, moderated by an experienced facilitator (KC). They were audio and video recorded *via* Zoom, with participants' consent. Verbatim transcripts from the discussion were produced and these formed the basis of the analysis, and the videos were referred to accurately capture non-verbal cues or infer inaudible portions. Transcripts were fully anonymised. Furthermore, the workshop aspect facilitated reflexive participation whereby participants were provided with prompt questions to not only answer for the purposes of data collection, but which also enabled them to critically evaluate their own practices and develop solutions to improve it.

Data analysis

To facilitate our system-wide evaluation, we adopted a staged approach to analysis. This enabled deductive and inductive analysis, and vis-à-vis the purview of our theoretical frameworks.

Initially, the framework method [51] was selected as a pragmatic guide to the analysis, which sought to understand the participants' lived realities of working within the stroke system and their perceptions how aspects of this create or mitigate health inequality.

This involved a period of familiarisation followed by re-familiarisation and an iterative and gradual process of creating codes, and the development of the framework. Codes were assigned to concepts emerging as a "barrier" or "solution" to achieving equality (deductive aspect). Inductive interim analysis was performed which enabled the identification of themes, through categorising the codes, which was then used to produce a framework. The analytical framework was subsequently applied to the remainder of the analysis. Organisation of codes, themes and data extraction was aided *via* NVivo.

In the second analytic phase, Tanahashi's categories were applied to understand how participants perceived inequalities within stroke services. We mapped the themes onto Tanahashi's model to identify bottlenecks across availability, accessibility (including financial), acceptability, contact, and effectiveness, and cross-referenced these to relevant WHO Building Blocks where applicable.

An intersectional lens was then used to interpret which social groups were most affected by these inequalities. Finally, to investigate why and how such inequalities were produced within the system, we drew on HSPA approaches, mapping findings back to the Building Blocks with greater impetus to identify policy options.

Scientific rigour

The adoption of widely utilised and trusted theoretical frameworks provided strong grounding for the rigour of our study. Furthermore, extensive steps were embedded to ensure rigour in the analysis. Two researchers independently coded all transcripts and met iteratively to reconcile discrepancies and refine the codebook; a third reviewer arbitrated unresolved issues. The evolving analytical framework was then discussed with the wider team to enhance credibility and dependability. A post-analysis agreement meeting with the research team was held, which finalised the analysis.

External validation was also sought in a subsequent engagement session with the stroke workforce in a local hospital. Staff members were presented the analysis and asked through informal discussions their reflections on the findings and the extent to which they felt it resonated. Finally, a summary of the findings was shared with participants in a written report and circulated *via* email, with an invitation for

comment and feedback should participants have found anything they considered not in alignment with the discussion.

The mapping of findings to the theoretical frameworks was conducted initially by one researcher and consolidated with the team through reflexive discussions. Disagreements were documented and resolved through discussion.

Researcher positionality

The team conducting this research are diverse in terms of personal attributes, including age, gender, ethnicity, nationality and residency, qualifications and experience. At the time of the study, authors RM (PhD, Male), JV (PhD, Female), KC (MSc, Female) and AK (MSc, Female) were all employed by an academic institution in the UK. RM's and AK's field of expertise is global public health and epidemiology, JV's is neuroscience, KC's is speech and language therapy and health studies. Researcher DU (MSc, Female) was an international student on a global public health master's programme.

KC moderated the focus groups, and was naïve to most participants, besides two who were employed at the same university. Their understanding of the national stroke rehabilitation service delivery models aided coherence and interpretation throughout discussions.

As intersectionality is a core theoretical concept underpinning our study, it was important for the team individually and collectively to reflect on how the intersections of our own identities as well as across the team, may have shaped our planning and execution of the study. These characteristics may have influenced the research in varied ways, including existing assumptions about and experiences of stroke rehabilitation, health and health care experiences more generally, and interactions with inequalities and injustices. Whilst objectivity was aimed for throughout the process, our positionalities may have influenced data collection, analysis, and synthesis.

Results

Participants

Ten representatives from a range of stakeholder groups and sectors were recruited. All participants attended the focus group discussion. They were provided with background information about the project and introduced to the researchers. The sample included different stroke health professionals (e.g., nurses and occupational therapists), stroke researchers and health and social care leaders, who were employed

Table 1. Characteristics and organisational roles of study participants.

Participant	Professional role	Relevant service, sector or employing organisation	Self-reported gender	Age range	Range of number of years spent in role
1	Clinical lead and stroke nurse	NHS commissioned third-sector community stroke services	Male	Not known	Not known
2	Occupational therapist	Adult social care services	Female	Not known	Not known
3	Service lead	NHS stroke rehabilitation service	Male	41–50	Between 8–11 years
4	Physiotherapist	NHS stroke rehabilitation service	Male	51–60	Between 3–7 years
5	Occupational therapist	Adult social care services	Female	51–60	Between 3–7 years
6	Community engagement professional	Third-sector community health organisation	Female	21–30	Between 3–7 years
7	Community engagement professional	Third-sector community health organisation	Male	Not known	Not known
8	Leadership role across allied health professions	NHS	Female	51–60	Between 3–7 years
9	Professor and director of community health care hub.	University	Male	Not known	Not known
10	Speech and language therapist, lecturer and researcher in stroke-acquired aphasia.	University	Female	31–40	Less than 3 years

by varied organisations for example, the county council, local NHS organisations and third sector partners. Table 1 provides an overview of the study participants. To maintain anonymity, professional role has been generalised whilst maintaining the necessary contextual information, and age and years spent in service have been provided in groupings rather than discrete values.

Findings part one: thematic framework analysis

In response to the primary research question, participants identified multiple aspects of the stroke system concerning rehabilitation and life-after-stroke services that contributed to health inequality. These initial findings served as a foundation for applying further analytical frameworks in subsequent sections. Barriers and facilitators were captured by three themes, which guided the framework analysis. These were: personal and social determinants, geographical and physical determinants and system level determinants. A summary of each theme is provided below.

Theme one: system responsivity to personal and social determinants

The existing stroke system was identified as producing barriers to equality of care for population groups associated with various personal and social level factors. These included common social determinants of health—such as socio-economic hardship and language barriers—that the system failed to adequately address. Others were related to the post-stroke disability status, and wider societal views of disability and rehabilitation. These factors are discussed not as inevitable attributes of individuals but as systemic disadvantages arising from inadequacies in the stroke care system. These interrelated challenges appeared to cluster most severely where multiple personal, social, and structural disadvantages intersected—an observation further explored through an intersectional lens in the following section.

Pre-stroke social determinants of health and access to health care

Several personal factors were raised by participants as worthy considerations when examining equality in the stroke care system. Participants spoke about challenges in reaching and engaging stroke survivors who were culturally and linguistically diverse in rehabilitation. A significant factor contributing to this was a lack of materials and resources available in multiple languages provided to the workforce, reducing the acceptability of service coverage for stroke survivors whose primary language is a language other than English. Further, despite the NHS being free at point of contact, financial hardship and circumstances could pervade patients accessing rehabilitation and medications. This included the need to pay for travel (which may need to be private, see the subsequent discussion) to rehabilitation settings if not provided through domiciliary care, as well as the burden of taking time out of work to attend appointments. Although NHS care is free, medications still require a nominal fee (around ten GBP per medicine) for working-age adults. These overlapping burdens illustrate how seemingly minor costs accumulate into major access barriers, particularly for economically vulnerable populations. Facilitators for such hardships discussed by participants included greater awareness-raising of the "pre-payment" plan (a lower-cost alternative for NHS patients requiring regular and multiple medications), and some reimbursement schemes offered. However, these are still not adequate, as one participant highlights:

> "…there are issues accessing outpatient services. There is reimbursement [options], but they have to pay initially, and they can't pay for it." (Participant 1, clinical lead in a third-sector stroke service)

Rehabilitation availability was often limited to nine am to five pm, Monday–Friday services. For stroke survivors with personal circumstances such as either themselves or their carer going to work, or performing family roles, attending appointments at these times were simply not an option. This mismatch between service hours and patient availability was a recurrent concern. One participant outlined the benefits of extended hours:

> "I was in a workshop recently on impact on patient and family, a person was saying that what he found really beneficial was an evening rehab. So, I think what he mentioned was of evening service, he was saying that

that was the actual time he was able to say that 'okay fine I can go for regular rehab' otherwise it was really hard because of family availability." (Participant 10, speech and language therapist at the university)

Post-stroke disability determinants of health and access to health care

Participants also discussed how particular stroke survivors became disadvantaged in accessing life-after-stroke support *because* of the effects of the stroke they were living with. In particular, those with communication impairments were seen as especially vulnerable to exclusion. Stroke survivors may be supported by rehabilitation professionals that are inadequately skilled to support their communication (besides sessions directly with a speech and language therapist) which can result in a myriad of challenges. For example, a physiotherapist may need to provide instructions on how to perform exercises, but if the patient has difficulties understanding language (i.e. has aphasia), then they may misunderstand the guidance. The importance of being able to comprehend and follow medication instructions was also highlighted as an issue for these individuals, which, without support could have drastic effects.

"There is no aphasia friendly patient leaflet explaining why you are on this medication. You are given this very small list….unfold this massive thing… There is no way they will engage in in understanding. This is why they go to GP (general practitioner) and ask questions." (Participant 3, stroke rehabilitation service lead in the NHS)

This quote illustrates how the lack of communication-accessible materials compounds exclusion. As the excerpt above illustrates, aphasia-friendly documentation was considered an essential facilitator, yet rarely implemented despite the availability of established guidelines [52]. In addition to communication difficulties, stroke survivors with lesser-known or rarer disabling effects were also considered to experience inequality in accessing the rehabilitation they needed. This was attributed to various factors, but predominantly related to the unavailability of specialists such as neuropsychologists embedded in the rehabilitation teams. Improved data collection on patient disability profiles was suggested as a long-term strategy to better align workforce capacity with emerging needs. Finally, individuals with severe mobility difficulties following their stroke were perceived to be especially disadvantaged by the current rehabilitation pathways, which was especially associated with the use of outpatient clinics and the required transportation versus domiciliary care, as outlined above.

Societal views on disability and rehabilitation

Participants described how societal perceptions of disability and rehabilitation shaped service utilisation and outcomes. Misunderstandings around what constitutes "rehabilitation" were common, with some staff reporting that patients could be unaware they had even received it. This created a disconnect between service delivery and patient expectations, undermining satisfaction and perceived value. Enhanced dialogue and shared goal-setting between patients and providers were suggested to bridge this gap.

Participants noted that rehabilitation activities were often not recognised by service users as such, which was associated with them reporting to other professionals that they had not accessed rehabilitation. Thus, this factor relates to acceptability of the service rather than availability – which appears to be experienced differently by individuals based on what they believe rehabilitation should be. This also was linked to beliefs around medicine and models of disability, where participants noted that sometimes stroke survivors and their families sought a "fix" or "cure" for their long-term post-stroke difficulties, which was not always realistic, nor the sole focus of rehabilitation. A shift towards person-centred and recovery-oriented messaging was viewed as essential for addressing these mismatches in expectation and experience.

Theme two: system responsivity to geographical and physical determinants

Availability of rehabilitation services in the largely rural and coastal areas under exploration was considered by participants to be too sparse, meaning dedicated rehabilitation teams had geographically

expansive communities to serve. For the workforce aiming to support stroke survivors in the community (e.g., in their homes) this might mean that fewer individuals are seen in a day due to travel requirements impacting caseload and reach. On the contrary, participants also indicated that rehabilitation services offered in centralised assets or outpatient clinics, where "*the patient needs to come to us*" (Participant 1, clinical lead in a third-sector stroke service) also caused challenges as it meant potentially long journeys for stroke survivors. From the perspective of both service provider and service user, this geographical inaccessibility significantly amplified health disparities in these coastal areas, which are less likely an issue in urban locations with denser populations and where services are available in closer proximity.

Participants reflected on some solutions which had been attempted in the region to address these issues, including increasing access to wheelchair-friendly taxis and a reimbursement scheme which offered to pay patients back for their travel expenses. However, these were deemed not sufficient, as the below excerpts demonstrate:

> "So, you've got a wheelchair taxi. But because they've got to walk – I don't know – fifty yards into the building and push him out. It's like, no!" (Participant 1, clinical lead in a third-sector stroke service)

> "There are issues accessing outpatient services. There is [travel cost] reimbursement, but they have to pay initially – but they can't pay for it." (Participant 8, leadership role across allied health professions in the NHS)

These illustrate how inequalities in access arise between those with either private transport (either driving themselves, or a carer to escort them) or the means to pay (upfront) for private hire, and those who cannot. Barriers to access were also exacerbated for individuals with mobility impairments, including those using wheelchairs, for whom even physically reaching the service was an ordeal, even when transport itself was not a problem. Furthermore, inequalities were identified as likely to arise particularly for those reliant on public transport, which was deemed by many to be of poor-quality and with limited coverage. Initiatives considered more successful in mitigating these barriers included a community transport system:

> "… They set up [a] side of us for our group on Wednesday afternoon, and we have 4–5 people come on that same Bus [which] works brilliantly, so it doesn't cost them anything. But even if it did, it wouldn't be a huge amount, and that is working well." (Participant 1, clinical lead in a third-sector stroke service)

However, participants reported that the existing community transport system had recently pushed back their offer in response to "*too many*" requests, in which services were advised that the solution was getting charitable funding for a mini-bus, underscoring flaws in financial configurations within the system. Additional facilitators to these environmental barriers involved enabling better knowledge and utilisation of local resources where they do exist in the vicinity (such as the community transport system, public transport options, and the locality of the rehabilitation centres that were available).

This discussion also highlighted how health and social care sectors could work together to tackle some of these inequalities in access to knowledge about *where to access* support, as illustrated in the quotes below:

> "Some of what we are trying to do in social care is to look at local support, and local network and help people" (Participant 2, occupational therapist, adult social care services).

> "People are able to access the services, whether those people have access to information and advice to suggest that, yeah [you] have high cholesterol or blood pressure… I think this is where we handle it, because it's a serious marginalized community." (Participant 3, stroke rehabilitation service lead in the NHS)

Ultimately, these environmental constraints were not only logistical, but deeply structural—reflecting underlying weaknesses in service design, local governance, and equitable resourcing. Cross-sector collaboration between health and social care was identified as crucial for making these solutions sustainable and equitable.

Theme three: system components and responsive service design. Several aspects regarding the structure of the stroke system and its design were highlighted as detrimental to stroke survivors' access to and acceptability of support. Participants spoke at length about how stroke rehabilitation offered was often

very limited, being mostly available at the initial post-stroke stages but with a significant lack of support available particularly after the early-supported discharge (ESD) period (which in the UK, is where medically-well enough patients are discharged back into the community and typically receive six weeks of rehabilitation at home). This was frequently referred to as a "gap" or "drop-off point," especially after the routinely-administered 6-week review. This was also associated with inadequate timing of rehabilitation where patients may have different needs across their recovery trajectory, but if it was not the focus of the initial 6 weeks then there was limited opportunity to rehabilitate them in those domains, going forwards. These insufficiencies produced inequalities. These issues are characterised by some of the excerpts, below from focus group participants:

> "I think this is a big gap in terms of, do they actually receive the vocational rehab when they need it? Because, we have skilled OTs! …But, if we can't make the two ends meet when the patients need it then it is useless to train people's expertise and knowledge, and then we are not able to provide it. There is no point… It's not just the service, actually whether the services are delivered when they are needed." (Participant 3, stroke rehabilitation service lead in the NHS)

> "I have realized that, I mean, the 6 months review is too late as far as for all the problems I am finding." (Participant 1, clinical lead in a third-sector stroke service)

Here, we see that rehabilitation responsive to emergent, long-term needs was perceived as unavailable and potentially of inadequate quality. This lack of coverage was attributed to system-level constraints which included staffing issues and staff retention struggles, which limited existing staff time. Simultaneously, greater training and access to professional development for existing staff on specialised, person-centred rehabilitation was suggested as being a facilitator, though the practitioners in the room voiced that access to development opportunities was similarly compounded by the system-pressures.

The issues were also linked with a perceived emphasis on ESD and the funding of this service, which whilst positive, may be associated to the detriment of provisions following the 6 week and 6 month period. The excerpts below from Participant 3 (stroke rehabilitation service lead in the NHS) illustrate these concerns:

> "I think, because we are talking about system, the whole system has invested heavily in the ESD category, as a nation we have invested in the pathways, treatment intensity and proper workforce and not this category, and other categories are in more need."

> "I think part of the problem is they manage to showcase that obviously, if you managed to shift somebody out of hospital very quickly, this saving this financial saving for us…obviously with all the saving, it has warranted this kind of push for ESD pathway…So we have to look at the clinical and patient outcomes, rather than the financial outcome which was driving the ESD."

This discussion subsequently unveiled some potential solutions. A systems approach to data collection was flagged as an opportunity to better monitor patient demographics and outcomes, to identify and act upon inequalities. Data in its current form was not able to be disaggregated due to poor data standardisation across the rehabilitation pathway (though, it was noted that this is better in the hospital stage, due to national audit imperatives). Importantly, participants considered that data collection should be patient and family-centred and inform on patient needs that would then enable better service design, based upon prevalence of pressing needs. Taking an equity angle, such data collection would thereby enable identification of inequalities and promote greater recognition of needs associated with a range of identities represented in the population. This issue is well illustrated through the quotations provided below, *via* participant 9 (professor in stroke rehabilitation), who discusses:

> "I'm also aware that what people need, and what we can get, changes over the years… Do we even have the ability to articulate what those needs are at the specific level? When we talk about fulfilling patients needs, we have to think – do we even understand what those needs are?"

> "[we should] Make the entire family a part of it and understand what people need and collate that data at the system level…"

Participants also highlighted the absence of service user input and opportunities for shared decision making in pathway design. Embedding patient and public co-design was viewed as not only a facilitator of service acceptability, but as a corrective to historical imbalances in whose needs are prioritised within system planning. These interrelated challenges appeared to cluster most severely where multiple personal, social, and structural disadvantages intersected—an observation further explored through an

Table 2. Issues identified across the rehabilitation and long-term support system map across the different elements of Tanahashi's framework.

Tanahashi component	Main issue	Specific examples
Availability	Services are only offered during standard working hours.	Stroke survivors or carers who are employed cannot access services during usual hours and therefore services are not available to them.
	After the 6 week and/or 6-month review points, rehabilitation services are not routinely available.	Stroke survivors with long-term or chronic needs cannot access services at times when they are required.
Accessibility (geographic and financial)	Rehabilitation centres are far; upfront transport costs are required.	Rural residents and people with mobility impairments who cannot afford advance payments cannot access services.
		People who are not able to drive after their stroke who do not have a significant other/carer face barriers to accessing services.
Acceptability (cultural and perceptual)	Lack of multilingual resources; staff are unprepared for cultural diversity	Non-English-speaking migrants, or patients with differing expectations of rehabilitation are not provided with acceptable service.
		Workforce do not engage in professional development.
Contact Coverage	Communication or cognitive impairments hinder effective use of services	People with aphasia who cannot interact with providers or understand instructions may have reduced contact due to misunderstandings.
Effective coverage	Services end prematurely, lack of long-term support.	Patients with chronic needs; inadequate training for personalised rehabilitation by staff

intersectional lens in the following section. This final section of part one thus provides the structural grounding for interpreting the coverage gaps mapped in parts two through four. By linking local barriers with system-level design failures, it offers an empirical bridge into the subsequent application of Tanahashi's framework, intersectional analysis, and system block mapping.

Findings part two: application of Tanahashi's framework to map equity gaps

To bridge the thematic insights from Part one with a structured health systems perspective to address research question two, we applied Tanahashi's framework as an organising lens. This model enabled a structured categorisation of coverage-related gaps across five dimensions: availability, accessibility, acceptability, contact coverage, and effective coverage. Each barrier raised by participants was systematically coded against these domains to clarify where and how the current system fails to ensure equitable access to stroke rehabilitation. Table 2 presents these findings alongside illustrative examples.

As shown in Table 2, the most critical gaps—namely in accessibility and effective coverage—correspond to failures across multiple system Building Blocks. This analysis reinforces the systemic nature of inequalities described qualitatively in part one. Accessibility deficits were primarily rooted in weaknesses in service delivery, financing mechanisms, and workforce distribution. In contrast, failures in effective coverage reflected deeper structural limitations in workforce capacity, health information systems, and governance arrangements.

Findings part three: operationalising intersectionality—who is most affected?

Applying an intersectional lens, participants' accounts indicated that inequalities concentrated where age, disability, geography, socioeconomic status, language/culture, and social support intersected. Responding to research question three, four recurrent high-risk profiles emerged: (i) older survivors with mobility and/or communication impairments living in remote coastal or rural areas and lacking private transport; (ii) socioeconomically deprived survivors—including non-car owners—who faced upfront travel costs and income loss when attending appointments; (iii) minority ethnic and migrant survivors with limited English proficiency or communication challenges, or unfamiliarity with UK healthcare norms; and (iv) people with complex or long-term disability profiles, those living alone or without carers, and those falling outside standard ESD criteria.

Across these profiles, disadvantages "stacked" along Tanahashi's dimensions: constrained service hours and discontinuity after ESD limited availability; distance, poor public transport, and upfront payments restricted accessibility; lack of culturally and linguistically appropriate resources undermined acceptability; communication and cognitive impairments reduced contact coverage; and insufficient specialist input and continuity eroded effective coverage. Participants thus perceived that without targeted

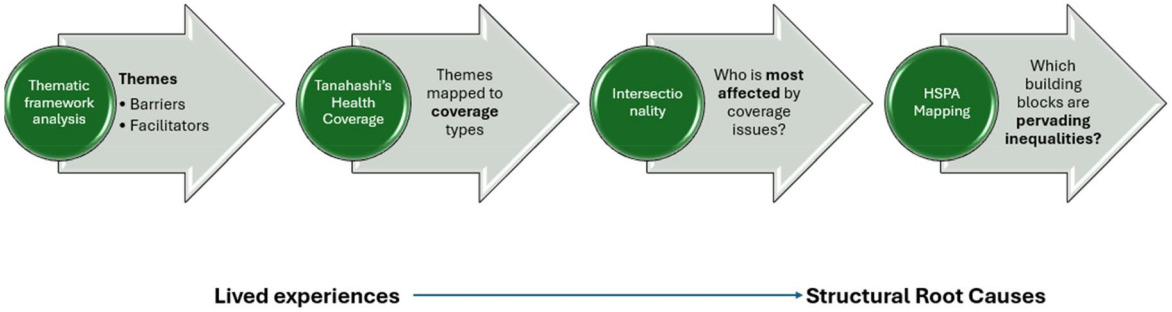

Figure 2. System mapping and analytical process.

Table 3. Mapping of the critical coverage concerns to the building blocks, highlighting significant points of failure of the system.

Critical inequalities	Building blocks affected	Explanation (how it is affected)
Accessibility	Service delivery, financing, workforce	Limited-service reach, upfront costs, and lack of mobile staffing exclude rural and low-income patients.
Effective coverage	Workforce, health information systems, leadership/ governance	No 'early supported discharge' continuity, insufficient data on long-term needs, and short-term policy focus hamper long-term recovery.

accommodations for intersecting needs, the system systematically underserves these groups. This application of intersectionality extends the equity analysis beyond isolated variables and aligns with the multi-level disadvantage patterns raised in part one.

Findings part four: system barriers mapped to stroke-care "building blocks"

To move from individual accounts to a system-level interpretation providing a holistic response to our research questions, the reported barriers were cross-walked onto stroke-care building blocks, derived from the HSPA. The analytical process building to this point is illustrated in Figure 2.

This exercise allowed us to identify which core components of the stroke system were considered inadequate and how this inadequacy translated into unequal outcomes for stroke survivors. Moving from the mapping reported in part two, which highlighted two domains of critical coverage concern (accessibility and effective coverage), they were subsequently mapped back onto the core building blocks of stroke system performance as shown below (Table 3). This demonstrates that accessibility barriers stemmed from weaknesses in service delivery, financing and workforce capacity—manifesting as limited reach of rehabilitation services, up-front travel costs, and inadequate mobile or community-based provision. Failures in effective coverage were linked to gaps in workforce, health information systems, and governance—seen in the lack of continuity beyond ESD, the absence of disaggregated data on patient needs, and short-term policy focus that undermined sustained recovery. Taken together, these system-level barriers show how structural limitations within stroke-care building blocks interact to reinforce inequalities, leaving the most vulnerable groups systematically underserved. This framework-level analysis closes the interpretive loop started in Part 1, linking lived experience to structural root causes.

Discussion

This study aimed to evaluate the equality of stroke rehabilitation and long-term support services in the region using a health system approach. The findings of this study align closely with Tanahashi's framework and intersectionality theory. By systematically mapping barriers onto coverage dimensions and highlighting how disadvantages accumulate across social, geographic, and disability-related axes, the analysis demonstrates that inequalities in stroke rehabilitation are not isolated but structurally embedded. This theoretical anchoring strengthens the validity of interpreting professional accounts as indicative of broader systemic dynamics.

Findings from parts two, three and four confirm that the stroke system exhibits critical failings in accessibility and effective coverage, as mapped through Tanahashi's framework and the HSPA system building blocks. It has highlighted a significant inadequacy of the stroke system to respond to personal and social factors which are influential determinants of whether stroke survivors can access services, and whether the service is acceptable, thus substantially limiting effective coverage. There are exceptional issues with service accessibility, which is exacerbated by the rural and coastal situatedness. Notably, accessibility barriers—particularly those related to transport, geography, and service hours—emerged as the most pervasive and were closely tied to workforce limitations and governance failures. There is clear evidence in the data of cumulative disadvantage, which risks those who are already on the margins of society facing even greater hurdles to getting and benefiting from the support they require. By cross-walking qualitative themes to system-level diagnostics, this study exposes how structural design flaws reproduce marginalisation within stroke care pathways.

Barriers and disadvantage

Importantly, this study identified how stroke survivors with intersecting personal, social, and structural disadvantages may experience the greatest barriers to accessing and benefiting from rehabilitation. These intersections often involve both agency-related variables (such as individual mobility, language ability, or literacy) and structural determinants (such as transport infrastructure, workforce limitations, or funding models), which together compound disadvantage. The local area is particularly afflicted by workforce shortages and retention issues which resonates with other research on the coastal health workforce in the empirical context [53].

Rather than functioning independently, these factors interact within a multi-systemic context that includes health, social care, transport, and voluntary sector systems. The impact of these multi-sector and system pressures is that stroke survivors receive a very basic service provision in the acute post-stroke window, with minimal opportunity for support afterwards, let alone specialist rehabilitation. Our data suggest that where these systems fail to coordinate or adapt to complexity, inequity is intensified.

Based on our analysis, we identified sub-populations whose risk profiles emerge from these layered interactions:

- Older adults with mobility impairments living in rural or coastal areas, experiencing poverty: Their exclusion stems from structural failures in transportation services, inadequate domiciliary provision, and misaligned service hours—all situated within workforce shortages and design of service delivery.
- Socioeconomically deprived individuals without access to private transport, including those experiencing income loss due to care needs: These survivors face cumulative disadvantages linked to travel costs, limited availability of community transport, and inflexible service hours that conflict with employment or caring responsibilities.
- Non-English-speaking migrants with aphasia and/or low literacy: Their challenges with engagement reflect a convergence of agency-level communication barriers and structural failures in information systems (e.g., lack of multilingual or aphasia-friendly materials), staff training gaps, and culturally insensitive care models.
- People with complex or long-term disability profiles, including those living alone or without informal caregiving networks: These individuals often lack tailored follow-up services and continuity of care, compounded by limitations in data tracking and service coordination.

There is some discussion of these heightened-vulnerability groups in the literature, though not always specific to stroke rehabilitation. For example, inequitable access to healthcare faced by elderly populations living in rural and coastal areas is emphasised by Yin, Huang and Han [54], whose index to assess one's capability for travel, combines a systems-viewpoint (including built environment and policy measures) with individual factors (including physical functioning, socio-economic status and caregiver assistance). An "equity-oriented transportation policy" is called for by Kaiser [55], who advocates for financially-subsidised transport policies as mediators of equity for socio-economically deprived groups,

identifying specific health-related outcomes from implementation, including a reduction of "missed medical appointments," "improved health status" and "reduced healthcare disparities" [55].

Disparities between health care access and quality between stroke survivors with aphasia and who are culturally and linguistically diverse and those who are not have been evidenced; barriers are similarly described to those in our study including lack of culturally and linguistically relevant materials, and limitations in the workforce's knowledge and skills [56]. Specific differences in rehabilitation have also been exposed: an Australian study found that people who have had a stroke and have aphasia, and require an interpreter, were less likely to receive specific kinds of rehabilitation, including from speech and language therapists and occupational therapists. Despite less therapy, hospital stays for rehabilitation for this group were seemingly longer, attributed to lack of access to interpreters [57]. Differences in outcomes for stroke survivors have also been identified to vary marital status (reflecting our observation regarding people living alone), potentially explained by ongoing practical support [58]; though this is not unequivocal, as other studies indicate those who live alone may actually do better in rehabilitation [59]. In light of our findings, the intersection of one's living circumstances *with* level of disability, *and* accessibility of rehabilitation may well explain these differences in the literature.

Collectively, these findings emphasise that these are not isolated variables but embedded within systemic constraints across service delivery, information systems, workforce design, and governance. Understanding these profiles as products of interlocking systems—rather than simply additive vulnerabilities—demands an intersectional response in both design and delivery of stroke services.

Solutions

Nonetheless, the discussion did reveal some potential solutions to these challenges, which if implemented may widen access and acceptability of life-after-stroke services and redress the inequalities currently noted. Sustainable financing of health systems underscores the capacities of the system to innovate and (re)allocate funds to build a strong health system [48]. It is acknowledged that renegotiations of funding allocations may be required for these solutions to be implemented, which under the changing landscape of the NHS and financial cut-backs, may present further challenges [60]. Whilst all innovations must be evaluated within the context of financial constraints, our study underscores that the pursuit of equity within health systems remains a non-negotiable objective.

Robust and holistic system-level health data to design population and patient-centred, life-long services

In line with the "Building Block" of Health Information Systems, participants indicated an essential solution to further exposing inequalities, and thus enabling targeted action addressing them, was systems-level, quality multi-dimensional data collection and data monitoring. Justifying this, professionals considered that such data would enable a significantly enhanced understanding of community and patient need essential to design services that are appropriate and promote equity, as well as serving as a way to monitor and address health inequalities.

This resonates with the findings suggesting that routinely collected patient data can be meaningfully used to attend to issues such as health inequalities, particularly through service evaluation and improvement [39]. Similarly, there is much policy rhetoric, particularly from the NHS, about the value of patient data and the utilisation of this for service quality improvement and service design, although, currently any major NHS investment in this regard is mostly aimed at improving economic efficiency and throughput (see, the "Model Health System" and "Model Hospital" from [61] rather than patient outcomes and inequalities.

On the other hand, data have been made available *via* The Office for Health Improvement and Disparities' Health Inequalities Dashboard' [62] and the Department for Health and Social Care's "Fingertips tool" [63] which arguably have greater emphasis on using data to monitor health inequalities, yet, these are not sufficient to meaningfully guide patient-centred stroke service design due to their lack of granularity. The SSNAP offers some opportunity to interrogate system-level (i.e., at the ESNEFT-level) inequalities in stroke specifically, however at present this also falls short of some key variables of relevance

including stroke patients' Preferred Language, and inadequacies in ethnicity recording and long-term follow-up [64]. However, significant strides need to be made to implement and utilise these datasets in the empirical context under investigation; a centralised system for longitudinal health and social care data recording is required.

Funded transport systems aligned to a multi-sector framework of health and social care for stroke

Access to transport also emerged as a significant barrier to equitable access of stroke rehabilitation. A multi-sector framework for the rehabilitation stroke system would support embedding of door-to-door transport options (including home-to-vehicle and vehicle-to-clinic assistance) that are free for those without access to alternative transport systems. For so long as support services exist beyond the household, affordable and accessible transport provides a fundamental bridge to physical and geographical barriers to rehabilitation coverage.

Transport poverty is common in rural settings, which is likely exacerbated by recent austerity measures and cut-backs in financial support to public transport [65]. This resonates with research in other rural areas with a similar healthcare system (Canada), which find that access to healthcare had a linear relationship to whether individuals were not car drivers nor had access to friends or family who were car drivers, those who had access to family or friends who were car drivers, or who were car drivers themselves [66]. There is further evidence that those with poorer health, mobility issues and a limited social support system who also face as transportation challenges are much less likely to access health care [67].

In our study, some community transport options were available, but these were limited, and additional pressure was placed on the third sector to undertake this work. This resonates with pertinent discussions around how withdrawal of public subsidies for transport options often result in charity-led transport initiatives "Filling the "void" [65]. Therefore, though charity-run wheelchair-friendly transport options were provided as a potential solution to inequalities in this study, it is important to consider the interactions of this in the broader context including political priorities and the balance of pressures across public, private, and third sector organisations involved in healthcare.

Though digital therapy is an often-cited solution for addressing barriers to service delivery including regional and transportation challenges [68], but also in optimising social participation [69], it is pertinent to critically examine how such solutions do or do not address health inequalities in such empirical contexts where socio-economic disadvantage is high, and in largely rural areas which may not have strong connectivity—deepending the "digital divide" [70].

Operationalising intersectionality in service (re)design

Finally, this study has revealed how utilising an intersectional framework can help to reimagine service design and create bespoke solutions to some of the most pressing barriers in relation to stroke rehabilitation service accessibility and effective coverage. For example, applying this we may conceive of how rehabilitation pathways for elderly women living alone, low-literate migrants with speech or language difficulties, and other multiply disadvantaged groups could be designed. These findings directly inform and justify the framework mappings and system-level critiques presented in parts two–four, where the cumulative nature of inequality is made explicit. Importantly, we acknowledge that implementation of the first solution – better data to understand populations and needs – would underscore the transformative potential of such an approach.

Together, these elements highlight that accessibility challenges arise from an interplay of structural deprivation, demographic pressures, and infrastructural limitations. Embedding these insights into policy design requires recognising how localised contexts—such as coastal deprivation and ageing populations—shape the effectiveness of national stroke care frameworks

Suitability of current policy

Overall, our analysis underscores the need for a rehabilitation and life after stroke system which adopts a multi-level, intersectional framework in its design and delivery. This is especially and perhaps uniquely relevant for this component of the stroke pathway (opposed to, for example, acute care) due to the

community-based location of care rather than a centralised, highly prescriptive service (like acute stroke medicine). The life-after-stroke pathway that is responsive to the diversity of the community it serves (members of which have a range of pre- and post-stroke personal characteristics and needs), in parallel with consideration of the geographical specificity and local assets available in the given context, offers greatest opportunity for system-driven health equality.

The qualitative insights are corroborated by contextual evidence from the study region. Jaywick, located within the coastal community under examination, is consistently ranked as the most deprived neighbourhood in England according to the Index of Multiple Deprivation 2025 [71]. This extreme socio-economic marginalisation underscores why financial and transport barriers emerged so prominently in participants' accounts. Similarly, the ageing demographic profile and limited transport infrastructure in coastal regions confirm that accessibility is not merely a perceived issue but a structural bottleneck that compounds inequalities in rehabilitation access.

In this regard, the enactment of policy directives such as the Core20PLUS approach seem inadequate to account for these needs. Ultimately, this "single-axis" approach is insufficient, and our findings highlight that policies such as Core20PLUS alone are insufficient to capture and address these overlapping layers of marginalisation. This study has demonstrated how adopting a theoretical standpoint of intersectionality has enabled a more nuanced understanding of how inequalities are currently a problem and how new services can be envisioned [72]. Scholarly interest in highlighting intersectionality, disability inclusion and health inequalities are growing [73–75] and offers a useful standpoint for inclusive system and service design.

On the contrary, ISDNs are provided with freedom to design services to meet community needs, in line with the NHSs' values of person-centred care. Person-centred care promotes practice which ensures "preferences, needs and values" of care-seekers guide decisions on practice and service design [76,77]. In principle, this offers ISDNs the opportunity to create stroke services that reflect the intersections of identity-based disadvantage most pertinent in their area, thus being able to "honour" person-centred care. Despite this, our findings suggest pervasive inadequacies of the system in achieving this, and rather, emphasise how existing structures may be only "privileged person"-centred. Furthermore, the current policies – including the new Ten Year Health Plan – fail to acknowledge wider determinants of access to health, such as transport and regional factors, and do little to address this. Given the dominance of this barrier in our findings, it signals that a more comprehensive, multi-systems policy is required to drive real transformation.

Limitations

This study describes a small scale, qualitative exploration of rehabilitation and life-after-stroke services in a specific region of the UK. Therefore, the findings should be interpreted with caution. Furthermore, these findings reflect the perspectives of healthcare professions, rather than service users. Whilst we considered that this valid given the systems-level focus of this study, this may have been enriched with service user voice. We should note that our wider project includes a specific study of collating stroke survivor experiences. Furthermore, we were not able to collate a complete dataset of participant information, reducing the opportunity for further contextual enrichment in our analysis. Lastly, though there is resonance of our findings with other research, the context of the NHS trust that this evaluation is based on may restrict transferability to other contexts, in other parts of England and internationally particularly where healthcare is not provided through the state. Another part of our study is examining inequalities in the stroke system quantitatively, and we anticipate that this will offer further nuanced understanding that would complement the qualitative findings described here. Finally, while Tanahashi's framework and intersectionality theory provided useful analytic scaffolds, further research is needed to explore how these approaches can inform practical service redesign in stroke rehabilitation.

Conclusion

This article has presented a qualitative exploration of the perspectives of stroke care professionals in a coastal region of England on whether the rehabilitation and life-after-stroke system in place currently gives rise to health inequalities, and how they can be addressed. While small in scale and locally

oriented, the findings from our work resonate with research conducted elsewhere, which emphasise that stroke survivors can face substantial barriers to accessing rehabilitation, which are compounded by social and personal factors, as well as environmental and system-level barriers, and thus these experiences are unequal and unwarrantedly varied.

By using Tanahashi's framework and intersectionality lens, this study illuminated how failures in availability, accessibility, and effective coverage intersect with population characteristics such as age, impairment, language, and geography. These dimensions combine to exclude particular profiles from sustained, person-centred rehabilitation. The interpretation presented here shows that equity cannot be achieved without structural reforms that address both system-level design and its differential impacts on multiply-disadvantaged groups.

Adopting a health-system approach which embeds intersectionality to examine clinical pathways, such as stroke care, offers advantages in reveal nuances underpinning inequalities and supports the reimagining of equitable systems design.

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Author contributions

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Data availability statement

The anonymised study data related to the findings reported in this article are not available for wider sharing.

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