

# Comparative Analyses of Neurorehabilitation Regulations and Health Equity in the U.S., Switzerland, and China

Linyue Lu

Department of Anthropology, Emory University, Atlanta, GA

<https://doi.org/10.33697/ajur.2026.170>

Student: [ariana.lu@emory.edu](mailto:ariana.lu@emory.edu)

Mentor: [alexandre.lambert@sit.edu](mailto:alexandre.lambert@sit.edu)

## ABSTRACT

As populations age and the burden of neurological conditions rises, equitable access to neurorehabilitation has emerged as a critical yet under-addressed public health priority for aging populations. This comparative study examines how healthcare structures in the United States, Switzerland, and China shape neurorehabilitation equity. This analysis combines semi-structured interviews with seven healthcare experts (neurorehabilitation clinicians, health economists, and scholars) and a systematic review of peer-reviewed literature, policy documents, and demographic data. In the U.S., fragmented insurance models and high out-of-pocket costs disproportionately limit access for low-income and rural populations. Switzerland's universal coverage masks the inequities driven by uneven financial incentive between acute and long-term care, urban-centric resource allocation, and referral mandates. Despite recent reforms, China's hybrid healthcare system struggles with hospital-centric resource concentration, varying policy implementation, and rehabilitation workforce gaps, particularly exacerbating urban-rural divides. Across all three, technology innovations like telerehabilitation offer promising potential for alleviating disparities, but are hindered by infrastructure gaps, digital literacy barriers, and cultural traditions. The findings underscore that financial systems, care-delivery hierarchies, and technology adoptions need to be aligned with health equity principles to alleviate neurorehabilitation gaps. The study proposes targeted policy reforms, including adjusting reimbursement schemes, easing referral mandates, and investing in digital infrastructure implementation, to inform international strategies for inclusive, sustainable rehabilitation care systems.

## KEYWORDS

Neurorehabilitation; Universal Health Coverage; Comparative Health Systems; China; United States; Switzerland; Health Equity; Regulatory Analysis

## INTRODUCTION

Neurorehabilitation is a multidisciplinary field that blends medical, physical, psychological, and technological interventions to restore function and improve quality of life for individuals with neurological disorders or disabilities.<sup>1</sup> As global life expectancy rises, neurological disorders such as traumatic brain injury, stroke, and Parkinson's disease have become leading causes of disability and mortality, spurring the demand for effective rehabilitation services.<sup>2</sup> The World Health Organization (WHO) estimates that 2.4 billion people worldwide could benefit from rehabilitative care, but access stays highly uneven, particularly in low- and middle-income settings, making equitable neurorehabilitation a pressing public health priority.<sup>3</sup> This study examines how healthcare systems shape neurorehabilitation access in three diverse contexts: the United States, Switzerland, and China, who were selected intentionally to represent a diverse spectrum of national income levels, financing arrangements, and care-delivery models.<sup>4</sup> All three face rapidly aging populations and thus soaring neurological disease burdens, yet each approaches healthcare service organization in markedly different ways.

The U.S. features a predominantly market-driven, employer-sponsored insurance model, supplemented by public programs such as Medicare and Medicaid. This mixed approach has incubated rapid innovation in technology and private-sector rehabilitation service delivery but also imposes significant out-of-pocket (OOP) burdens and varying accessibility under fragmented state regulations. Switzerland's Bismarck-like system, by contrast, achieves near-universal coverage through mandatory health insurance (MHI) and supports some of the world's most advanced rehabilitation facilities. However, its decentralized canton-based governance and mixed reimbursement mechanism that favors high-volume acute care over the more sustained rehabilitation create regional disparities.<sup>5</sup> Finally, China's evolving hybrid system has achieved near-universal Basic Medical Insurance coverage and is piloting reforms to promote rehabilitation; nonetheless, its vast geography, the aftermath of the One-Child Policy, and uneven infrastructure exacerbate urban-rural and gradients of socioeconomic status (SES) in service availability.

Previous research on neurorehabilitation has largely emphasized clinical efficacy, highlighting interventions such as robotics, virtual reality, and telerehabilitation.<sup>6,7</sup> While these studies confirm short-term benefits, evidence on long-term cost-effectiveness and system-level implementation remains limited. Most analyses focus narrowly on therapy outcomes, with less attention to financing, workforce distribution, or integration across care settings. Cross-national comparisons are especially scarce, leaving gaps in understanding how health system structures shape access.

The research objective of this paper is to analyze the challenges in neurorehabilitation access posed by financing schemes, organizational structures, and digital innovations in these three settings, and to evaluate systemic barriers to equitable care. To address this, the paper will: 1) compare each country's insurance frameworks and reimbursement mechanisms, 2) evaluate the impacts of referral processes and care-delivery structure 3) analyze the role of technological innovations in extending service to underserved communities. Through interactive field research with experts from diverse backgrounds and secondary supporting resources, this study aims to identify transferable strategies that can inform more inclusive neurorehabilitation systems worldwide.

## **METHODS AND PROCEDURES**

This research employs a mixed-methods comparative analysis to investigate the structural and contextual drivers of equity in neurorehabilitation access across the U.S., China, and Switzerland: healthcare system design, regulatory frameworks, and emerging technologies. Integrating qualitative primary data from expert interviews with secondary evidence from peer-reviewed literature, official policies, and statistical reports, this study allows for in-depth examination of each country's unique healthcare organization while identifying common patterns and divergences across, to generate transferable strategies for global practice.

### *Primary Data Collection*

Formal and informal semi-structured interviews constituted the primary qualitative data source, which offer first-hand expert perspectives on neurorehabilitation delivery and equity challenges. Eight interviews were conducted between February and April 2025, with stakeholders in each country (see Appendix 1 for details).

The interviewees were chosen purposely to ensure domain span, representation of clinical, research, and policy-making sectors, and international experience such as being prior visiting scholar abroad. The experts include: health economists, neurorehabilitation clinician-researchers, and health system administrators, and physical therapists. Respectively, they offer invaluable perspectives to understand financing incentives, to capture clinical workflow and referral practices, to clarify regulation effectiveness and implementation challenges. After sending email invitations, I finalized the participants based on availability. Interviews were held via Zoom and Tencent Meeting, conducted in English or Mandarin Chinese, and lasted around 45 to 60 minutes each.

These interviews were conducted to gather diverse perspectives in exploring the neurorehabilitation system and health equity. On top of that, this approach captures insights that are often undocumented in public sources, such as nuanced cantonal variations in policy directions and informal referral incentives.

### *Secondary Data Collection*

A systematic literature review was performed across PubMed, ResearchGate, and Google Scholar using a wide range of keywords such as "neurorehabilitation", "rehabilitation referral", "health insurance copayment system", "telerehabilitation equity". Among all kinds of sources, peer-reviewed articles, reports from worldly renowned non-profit organizations, and governmental policy documents accessed directly from official websites were prioritized to ensure accuracy and quality. Gray literature including government reports and commercial evaluations was examined for credibility, relevance, and neutrality. Statistical data on demographic trends and healthcare workforce were drawn from national health authorities and international databases. Together, secondary sources provide quantitative and qualitative evidence for cross-national comparisons.

### *Ethical Considerations*

Prior to the start of the project, the local review body approved the Human Subject Review for individuals involved. All formal interviewees were provided with project descriptions, proposed interview questions, and consent form outlining the study's data use and confidentiality safeguards, and they received the final draft of paper for their review. No vulnerable populations, like minors, were involved. The IRB registration number is IRB00005219.

*Limitations*

The main methodological constraints involve limited sample size, potential selection bias, and language barrier. With seven interviews conducted, the qualitative findings reflect expert viewpoints but are unable to capture every possible perspective. Both of the Chinese experts, despite specializing in distinct fields, are from the same institution, which may contain regional bias and fail to provide information on other parts of China. Additionally, secondary analysis for Switzerland relied predominantly on English sources and limited selection of documents in French, so some German and Italian information may have been underrepresented. In spite of these limitations, the research design yields a comprehensive view on how structural factors converge to shape equitable neurorehabilitation access by combining policy analysis with targeting expert insight.

**RESULTS**

Healthcare systems worldwide face increasing demand for equitable long-term multidisciplinary services, including neurorehabilitation. Financial arrangements, care delivery architectures, and the adoption of emerging technologies all play a pivotal role in shaping who benefits from these essential medical services. This comparative analysis of the United States, Switzerland, and China examines how insurance policy frameworks and reimbursement structures shape the affordability and sustainability of neurorehabilitation; how structural inequities in care delivery, including referral mandates, workforce distribution, integration of rehabilitation contextualized healthcare settings, influence pathways to timely and effective treatment; and how digital health innovations such as telerehabilitation and immersive therapeutic technologies break the geographic restriction while face hidden challenges of awareness and infrastructure that awaits solution. To identify systemic factors for reforms and lessons that can inform more inclusive and equitable integration of neurorehabilitation, the diverse healthcare architectures in three countries are examined.

*Insurance Policy Frameworks and Reimbursement Policies*

Financial factors in healthcare profoundly determine who can afford sustained, multidisciplinary care and which providers are incentivized to sustainably deliver them. Although the U.S., Switzerland, and China operate vastly different healthcare systems, each offers a baseline insurance to ensure healthcare access to the disadvantaged population: Medicare and Medicaid in the U.S., the MHI in Switzerland, and Basic Medical Insurance in China. Yet, in all three contexts, reimbursement mechanisms structurally disadvantage long-term neurorehabilitation compared to acute or diagnostic care. In the U.S., although public programs coexist with private plans, the low reimbursement rates of Medicare/Medicaid and high cost-sharing burden publicly insured patients. Both Switzerland and China devised unique payment systems for rehabilitation, which have yet to address the undervaluation of rehabilitation’s long-term benefits. Despite distinct financing structures, a common theme emerges: neurorehabilitation remains underrecognized within systems that reward quicker outcomes perpetuates inequities in access, particularly for those with lower financial, geographic, or institutional resources (Table 1).

	Coverage Model	Reimbursement	Key Challenges	Equity Concern
Shared	Baseline insurance programs	Structures favoring short-term interventions	Financial disincentives for service provision	Financial and geographic barriers
U.S.	Private dominant + Medicaid/Medicare (Uninsured problem)	Medicare Part A (100-day), Part B (limited outpatient); lower public reimbursement; recent fee cuts	High OOPs, plan complexity, varying state rules	Publicly insured patients face long wait times and care delays
Switzerland	Mandatory Health Insurance + private supplements (with low-income subsidies)	Inpatient: DRG-based flat rate Outpatient: capped reimbursement	Low outpatient reimbursement, fragmented services, cantonal variation	supplemental insurance for wealthier patients; rural cantons face higher vacancy
China	Urban employee + Urban-Rural Resident Basic Medical Insurance	Excluded from DRG/DIP, localized strategies; more coverage at primary-level institutions	Hospital-centric mindsets; weak community rehab, trust gap in lower-level facilities	Limited local services for rural and low-SES populations

**Table 1.** Comparative Summary of Neurorehabilitation Coverage Models and Equity Barriers

*United States: public V.S. private insurances and OOP burden*

The U.S. healthcare system relies heavily on employer-sponsored insurance, a model established in the 1920s and later expanded through public programs like Medicaid and Medicare. These programs aim to help vulnerable groups—such as low-income individuals, older adults, and people with disabilities—access basic medical care. Notably, long-term rehabilitation, as an essential part of neurorehabilitation, is excluded from essential coverage mandates, and the cost-sharing mechanisms disproportionately burden vulnerable populations. Medicare Part A typically covers only post-acute care, short-term skilled nursing facility stays up to 100 days, and part B pays for limited outpatient sessions.<sup>4</sup> For conditions like chronic spinal cord injuries or traumatic brain injury, long-term rehabilitation processes can exhaust insurance limits, resulting in high OOP costs of patients (Appendix 1, Interview 3). While specific U.S. neurorehabilitation cost data is limited, comparative data from Canada underscore this burden: over 62% of patients with spinal cord injury and 39% of those with traumatic brain injury report OOP expenses for at least one category among medication, assistive devices, rehabilitation therapy, and home care services.<sup>8</sup> These financial hurdles have a direct impact on treatment adherence. Using cardiac rehabilitation as a model, research shows that for every additional \$10 spent OOP on the first session, patients attend 0.41 fewer sessions on average.<sup>9</sup>

As the majority falls outside the public programs, private insurance plays a crucial role in the American healthcare landscape. Under the Affordable Care Act (ACA) enacted in 2010, individual and small-group market plans are required to cover ten essential health benefits, which includes rehabilitative services and necessary devices.<sup>5</sup> Yet, the fragmented nature of insurance practice leads to variation in neurorehabilitation cost, and the legal terms and conditions on the insurance contracts are often hard to read and confusing for common people, particularly those with low literacy. Due to the necessity of follow-up neurorehabilitative sessions for extended periods, therapies long after the acute treatment that falls out from the insurance coverage are underutilized because of the OOP burden they could put on patients (Appendix 1, Interview 3). Consequently, high deductibles, copays, and complex insurance limitations deter patients from seeking rehabilitative services, a burden further compounded by systemic racial and ethnic disparities.<sup>6,7</sup>

Reimbursement structure further deepens rehabilitation inequities. Medicare and Medicaid pay rehabilitative specialists significantly less than private insurers for the same services, leading many providers to limit appointments for publicly insured patients.<sup>8</sup> For example, Medicaid patients have greater difficulty scheduling healthcare appointments and are simulated to face 1.3 days longer wait times for primary care appointments than those under commercial insurance, resulting in care delays.<sup>8,9</sup> A 2025 Medicare fee cut of 2.93% in average service payment rates under the Physician Fee Schedule threatens to reduce provider participation further, worsening shortages in less economically developed areas where specialists are already scarce.<sup>10</sup>

These gaps interact with SES and geographic factors: rising premiums and complex billing practices exert high financial burden to the average population, while low reimbursement rates push neurorehabilitative therapists toward urban, wealthier patient pools.<sup>11</sup> People with better financial resources access timely, comprehensive neurorehabilitation, whereas others face delayed care or worsening risks of disability due to unmet needs. Although ACA expanded insurance coverage, its loopholes to address long-term neurorehabilitation leaves a considerable number of the populations lacking access to recovery.

*Switzerland: reimbursement bias under universal coverage*

Switzerland's healthcare system features universal coverage and decentralized governance. With an open enrollment mechanism, its MHI ensures nearly all Swiss residents have access to a broad, standardized care package, including most physician visits, inpatient care in institutions, outpatient homecare via specialized organizations, and medically prescribed rehabilitative services like physiotherapy and occupational therapy.<sup>4,12</sup> However, equitable neurorehabilitation access faces systemic inequities due to reimbursement structures and regional resource disparities.

Although long-term care has been increasingly recognized as essential in recent years, low reimbursement rates drive therapists out from outpatient neurorehabilitation. While acute care adopts diagnosis-related groups (DRGs) and fee-for-service compensation systems that reward high-volume services, neurorehabilitation relies on a more complex per-service payment manner that fails to account for its intensive, multidisciplinary, and long-term follow-up demands. For example, outpatient neurorehabilitation requires coordinated care across physical therapists, neurologists, and speech therapists, but the reimbursement models compensate an undesirable amount to each service in comparison to acute interventions like surgeries and diagnostics (Appendix 1, Interview 4). This financial disincentive discourages providers from specializing in neurorehabilitation, leading to a higher therapist vacancy rate in rural regions in Central Switzerland, compared to the Northwestern or Lake Geneva regions.<sup>13</sup>

Reimbursement factors contribute directly to inequitable access to neurorehabilitation in several distinct ways. Healthcare providers, responding to the MHI reimbursement incentives, naturally prioritize higher-margin medical services compared to rehabilitation. For example, studies on Swiss acute neurorehabilitation have shown that while costs per patient have increased (by approximately 20,000 from 2012 to 2013, average reimbursement has simultaneously diminished, creating a cost-revenue imbalance that discourages providers from offering longer and more complex rehabilitative care.<sup>14</sup> Furthermore, the implementation of DRGs has been linked to a relocation of resources to outpatient care and significantly higher 90-day rehospitalization rates, suggesting a potential decline in care continuity for rehabilitative patients.<sup>15</sup>

These structural issues are exacerbated by geographic supply factors: the utilization of health services in Switzerland is strongly dictated by the regional supply of providers. A greater concentration of specialists in urban cantons correlates with significantly higher per capita consumption of MHI services, while rural and remote populations face acute supply-side barriers.<sup>16</sup> Patients in need for long-term, specialized follow-up care need to contend with fewer available slots, greater travel distances, and a more tenuous care-seeking journey in general. Wealthier individuals can, however, mitigate these problems by purchasing semi-private or fully private supplementary health insurance that covers extended therapy duration and more intensive rehabilitation protocols. This reality means that, even under universal MHI, neurorehabilitation becomes de facto less accessible to those without the means for additional coverage, manifesting equity divide based on SES (Appendix 1, Interview 5).

#### *China: Localized Management and Tiered Financing*

The healthcare system in China achieves near-universal coverage through publicly funded Basic Medical Insurance, with multiple parallel programs. Urban residents are typically enrolled in employment-based programs, while rural population and the self-employed participate in the Urban-Rural Resident Basic Medical Insurance.<sup>4</sup> With central governments providing regulations that protect basic rights and offer overall guidance, local governments play a more vital role in organizing services and implementing health legislation based on local conditions (Appendix 1, Interview 7).

Basic Medical Insurance in China primarily operates on a fee-for-service basis for inpatient care with a DRG/DIP (Diagnosis-Intervention Packet) system. While these programs are covered, the bundled payment model sets strict caps on the amount reimbursed per patient. Because neurorehabilitation requires long hospital stays that often exceed the time period covered by these fixed standards, individual treatment costs frequently surpass the insurance payout, resulting in significant financial deficits for rehabilitation departments.<sup>17</sup>

In response, the Chinese healthcare administration initiated a reform in 2019 that excluded rehabilitation from the DRG/DIP mechanism.<sup>18</sup> Local governments have since begun to formulate management measures according to local context. For example, in Guangdong Province, tiered per-bed-day financing model is applied to patients diagnosed with specific neurological conditions, including traumatic brain injury, cerebral hemorrhage, brain tumors, and ischemic stroke, spinal cord injury.<sup>18</sup> Under this model, the reimbursement for rehabilitation is compartmentalized into acute and rehabilitation sectors, with acute phase being financed under DRG/DIP system while expenses in the rehabilitation phase being reimbursed on a per-bed-day basis. Furthermore, the provincial healthcare administration set payment standards that vary according to the level of medical institutions: for instance, patients receiving care at primary institutions can receive a higher proportion of their expenses reimbursed compared to those visiting secondary and tertiary institutions. Although this reimbursement mechanism is devised to encourage the use of primary and community health services with financial incentives, Chinese patients remain free to choose their healthcare providers, and the anticipated shift to community care service utilization still has a long way to go.

#### *Referral Pathways, Resource Distribution, and Barriers to Service Access*

Despite efforts toward equitable healthcare provision, all three countries exhibit systemic inequities in neurorehabilitation service delivery. The disparities are not only rooted in financing, but also deeply embedded in structural arrangements of healthcare systems. Neurorehabilitation uniquely relies on continuity of care and requires timely coordination across multiple stages from acute to outpatient treatment. Thus, in cases with fragmented referral processes or uneven resource distributions, access to comprehensive care becomes increasingly dependent on a patient's income, geographic location, and social status. Across the three systems, delivery models that favor acute care, workforce shortages, and regional variations result in delays, inefficiencies, and unmet needs for marginalized populations. This section explores how these challenges are associated with each country's distinct healthcare architecture (Table 2).

	Referral	Resource Allocation	Key Challenge	Equity Concern
Shared	Fragmented pathways	Urban-rural disparities; workforce shortage	Urban-rural resource imbalances	Delayed therapy and fragmented services for the rural and low-income
U.S.	Varies across states	Uneven; rural areas lack specialists; urban areas better served	Delays for marginalized patients; price opacity impedes care-seeking	Underutilization for the less wealthy
Switzerland	Mandatory referral by physician	Rural-Urban variation; more progressive investment in French-speaking regions	Delayed diagnosis, under-referral; costly transport; foreign worker cluster in cities	Accessibility based on SES and canton of residence
China	Free choice of providers	Rural lacks rehab facilities and staffs; cultural preference on informal care	Hospital-centric, few local specialists; poor care quality in rural areas	Week primary-care structure hinders care in remote regions

Table 2. Comparison of Referral Pathways and Resource Allocation Strategies

*United States: Fragmented Referrals and Financial Uncertainty*

Across the United States, the combination of price opacity, referral fragmentation, and workforce maldistribution establish structural barriers to equitable neurorehabilitation. This section examines how referral bottlenecks, inconsistent direct-access policies, and lack of price transparency intersect to limit neurorehabilitation availability, especially for the marginalized.

Despite evidence that early rehabilitation improves functional outcomes, many Americans still face persistent delays in obtaining outpatient physical therapy due to referral inefficiencies. Research has shown that long wait times for rehabilitation services correlate to adverse patient outcomes, stemming from processing bottlenecks in care coordination and mismatches between patient needs and facility capacity. Neurological and musculoskeletal patients comprise 60.2% of those requiring rehabilitation post-acute care rehabilitation and generally benefit from standardized pathways with an average wait times of 4.57 days. In contrast, access remains highly unequal for patients with complex comorbidities, low SES, and those living in rural areas where specialist scarcity is the most acute.<sup>19-21</sup> Neurorehabilitation-specific studies further underscore the problem. For sensorineural hearing loss, a common cause of pediatric morbidity, lower sociodemographic status is associated with rehabilitation delays and thus poorer language outcomes and speech intelligibility.<sup>22</sup>

These disparities are worsened by state-level policy variability. While states like Massachusetts permit direct patient access to physical therapists, others impose referral mandates. In Ohio, licensed physician approval is mandatory before initiating therapy, while Oklahoma and Georgia permit limited self-referral periods (30 days or 21 days/8 visits, respectively) before requiring physician referrals.<sup>23-25</sup> This inconsistency leads to uneven entry points into care and prolongs delays.

The lack of financial transparency further discourages patient engagement with neurorehabilitation. Although federal price transparency rules were introduced in 2020, their enforcement is inconsistent due to various factors such as geographic location and revenue levels.<sup>26</sup> Plus, there is not a strict mandate for therapists to disclose clear treatment plans and corresponding prices for patients to choose upon therapy initiation, given the ongoing ethical debates on affordability and medical decision making (Appendix 1, Interview 1). This uncertainty particularly deters the low-income, the uninsured, and many illegal immigrants from accessing necessary therapies, who fear unexpected medical debt.

Together, processing delays, referral fragmentation, and cost uncertainty result in a tiered care system. Access to timely, quality neurorehabilitation increasingly depends on geography, SES, immigration status, and insurance status, perpetuating cycles of health and financial vulnerabilities.

*Switzerland: Decentralized Administration and Referral Requirements*

Switzerland's MHI system guarantees universal coverage for neurorehabilitation, yet structural inequities persist due to mandatory referral requirements, regional resource imbalances, and financial disincentives for outpatient care, especially for rural and low-income communities.

First, the obligate referral system discourages timely utilization: without direct access, many patients who would benefit from early neurorehabilitative intervention get delayed care, or even never receive it. Physicians are typically better compensated for diagnostics and pharmaceuticals than for care coordination, while some benefit from financial incentives tied to pharmaceutical companies or diagnostic labs (Appendix 1, Interview 5). Clinicians' knowledge gaps often lead to unrecognized neurorehabilitation needs, with specialists noting not-uncommon delays that compromise recovery windows (Appendix 1, Interview 4, Interview 6). Low patient health literacy compounds these missed opportunities and disparities.

Second, decentralized governance produces significant inter-regional disparities in neurorehabilitation investment. Urban, French-speaking cantons like Geneva have promoted more robust professional programs and competitive specialist salaries. Comparatively, some German-speaking cantons prioritize acute hospital care over long-term multidisciplinary rehabilitation. More rural regions such as Central Switzerland suffer from underfunded neurorehabilitation outpatient clinics, scarce specialist availability, and prohibitively costly long-distance transportation.<sup>13</sup>

Third, Switzerland's high reliance on foreign healthcare workers complicates the urban-rural disparity: around 40% of physicians practiced in Switzerland are foreign-trained workforce, and 31% of new primary-care doctors recruited from EU programs drawn by urban-center salaries and resources.<sup>27</sup> As these practitioners cluster in Lausanne, Bern, and other metropolitan areas, rural neurorehabilitation services are understaffed, and patients face extended delays for critical services like complex post-stroke care.

Collectively, mandatory referral protocols, decentralization, and financial misalignment contribute to a stratified landscape where timeliness and quality of neurorehabilitation depend on geographic location and SES, contradicting the goal of equitable care access.

*China: Hospital-Centric Patterns and Rural Workforce Deficits*

China's rapid development poses unique opportunities and challenges for equitable neurorehabilitation. To address growing needs and regional disparities, the government has launched initiatives centering on county-level medical communities ("县域医共体") as the backbone of the Flagship Hospital Alliance ("医联体"). In this network, most tertiary and secondary hospitals – 3,275 and 10,848 respectively in 2021 – concentrate on acute care with some post-acute treatments, with a smaller number of dedicated rehabilitation and geriatric hospitals providing intensive post- and sub-acute services. By contrast, primary health care centers such as community clinics offer basic outpatient rehabilitation care.<sup>28</sup>

Despite predominant public ownership of over 80% of these facilities and patients' freedom to choose care providers, a multitiered copayment system promotes community health centers by offering higher reimbursement rates for services provided at the primary level. Still, rehabilitation seekers in urban areas overwhelmingly bypass community-level rehabilitation, seeking higher-quality neurorehabilitation in tertiary hospitals (Appendix 1, Interview 7, Interview 8). Until service quality at the community level improves, these copayment differences fail to direct patient flows.<sup>29</sup> Indeed, in 2019, only 74.36% of tertiary and 18.23% of secondary hospitals housed dedicated rehabilitation departments, far below the 100% policy requirement.<sup>30</sup> This hospital-centric pattern overwhelms top-tiered centers, undermines medical efficiency, and exacerbates rural-urban divides.

In response, County-level Medical Community (CMC) reforms mandate flagship hospitals to mentor subordinate centers through shared budgets, specialist rotations, and training programs. In Shanxi Province, these reforms yielded a 35.6% improvement in general hospital service efficiency.<sup>31</sup> However, critical gaps persist: by 2020, only 3.3% of all hospital beds were allocated to rehabilitation departments, versus 18.2% in the EU.<sup>29</sup> In 2022, the number of rehabilitation providers (94,342) accounted for less than 1% out of all healthcare providers nationwide.<sup>32</sup> A skewed sex ratio at birth further shrinks the pool of potential female caregivers, who comprise 70% of the health and social care workforce globally, in communities that most need support.<sup>33,34</sup>

Without sustainable incentives to retain experts or formal supervisory structures, rural and lower-SES communities stay underserved and forced to travel long distances at high expense for basic neurorehabilitative care. Inter-institutional 'pairing' initiatives, which deploy medical assistance teams from elite urban hospitals to rural facilities, offer short-term relief, but low rural

salaries, limited career paths, and poor living conditions hinder experts from permanent placements (Appendix 1, Interview 8). Thus, reforms must address hospital-centric resource allocation, workforce deficits, and rural retention of specialists to ensure equitable neurorehabilitation access across China.

*Digital Neurorehabilitation and the Equity Divide in Access*

In recent years, digital health technologies have rapidly expanded neurorehabilitation delivery. With COVID-19 catalyzing the mainstream adoption of telerehabilitation, virtual reality (VR), video games, brain-machine interfaces, and other therapeutic interventions across the United States, Switzerland, and China. They can overcome longstanding barriers of geography, mobility, and cost while allowing highly individualized exercises that increase patient engagement and accelerate recovery.<sup>35-37</sup>

All three countries have integrated digital innovation into national health agendas, from U.S.’s reimbursement reform to Switzerland’s DigiSanté and China’s Internet Plus Healthcare strategy.<sup>38,39</sup> However, uneven utilization of telerehabilitation and assistive devices and low digital literacy in older adults, low-income communities, and rural populations lag behind policy goals.<sup>40</sup> Equitable adoption is further impeded by weak post-pandemic follow-up in Switzerland and low public awareness of rehabilitation in China. These shared issues highlight the need for robust support systems, inclusive frameworks, and localized strategies to address digital divides (Table 3).

	Telerehab Adoption	Technology Integration	Key Challenges	Equity Concern
Shared	Used in COVID	All introduced supportive policies	Infrastructure gaps, varying adoption	Tech access; rural and older populations vulnerable
U.S.	High rural engagement; supported by CMS reimbursement	Standardized professional guidelines; Pilots using VR, games, and remote evaluations	Patients with limited tech access/literacy excluded from research	Bias in industry-funded research
Switzerland	Adoption during pandemic driven by DigiSanté	Advanced tech (e.g., VR, gaming) limited to 6-7 centers, mainly in urban hubs	Therapists reluctant to continue digital care; Follow-up usage data lacking	Older and remote residents face digital exclusion
China	Government-supported pilots; utilized existing platforms (WeChat/Alipay) Low rural uptake	Strong state investment/“Internet Plus Healthcare” promotes standardization and coverage	Hospital/community infrastructure uneven Cultural beliefs discourage active rehab	Knowledge gaps and lack of clinician guidance hinder rural elders

**Table 3.** Adoption Patterns and Challenges of Digital Neurorehabilitation Technologies

*United States: Rapid Uptake with Structural Gap in Connectivity and Access*

The United States has witnessed significant growth in telerehabilitation as a strategy to bridge geographic and socioeconomic disparities in neurorehabilitation access, especially following the COVID-19 pandemic. A critical development occurred in April 2020 when the Centers of Medicare & Medicaid Services (CMS) expanded telehealth reimbursement to include rehabilitation therapists.<sup>41</sup> This policy change formally established payment mechanisms for two-way, real-time interactive telehealth services encompassing e-visits, check-ins, remote evaluations of recorded video/images, and telephone assessments. Concurrently, professional guidelines were developed to standardize telerehabilitation and ensure care quality, through publications like *Physical Medicine and Rehabilitation Clinics of North America: Traumatic Brain Injury Rehabilitation and Physical Medicine*.<sup>41</sup>

Rural residents have been particularly active adopters of telerehabilitation for stroke recovery. Utilization rates increased dramatically from 0.6 to 8.6 per 1,000 ischemic stroke cases in rural areas, compared to the more modest increase from 0.3 to 2.3 among urban residents.<sup>37,42</sup> However, significant barriers persist, as over one-fifth of the telerehabilitation studies systematically exclude individuals lacking reliable internet or device access.<sup>43</sup> Moreover, the funding landscape has shifted from National Institutes of Health (NIH) grants toward industry-sponsored research, raising concerns about long-term support and potential biases in evaluation (Appendix 1, Interview 2).

*Switzerland: Digital Health Infrastructure with Limited Neurorehabilitation Uptake*

Although comprehensive studies specifically addressing neurorehabilitation are limited, Switzerland has implemented progressive telemedicine initiatives through its decentralized healthcare system. The federal “DigiSanté” programme, launched by Le Département fédéral de l’intérieur, creates both the technical infrastructure and governance framework to support remote consultations, data sharing, and cross-cantonal coordination of follow-up care.<sup>38</sup>

The pandemic served as a catalyst for adoption, with telerehabilitation utilization among Swiss physiotherapists surging from 4.9% pre-pandemic to 44.6% at its peak, according to the survey data from 742 practitioners nationwide.<sup>44</sup> Notably, therapist-led tablet-based interventions demonstrate particular efficacy for aphasia rehabilitation following stroke and traumatic brain injury, showing significant language gains and high patient satisfaction.<sup>45</sup> The Swiss Tele-Assisted Rehabilitation and Training (START) program further enhances care continuity by supporting patient transitions across clinical settings. However, substantial challenges lie ahead. Two-thirds of the physiotherapists from the telerehabilitation survey expressed no interest in continuing remote services post-pandemic, and follow-up data on sustained adoption is lacking.<sup>44</sup>

Advanced technologies like VR and game-based neurorehabilitation protocols are beginning to emerge in cutting-edge clinical treatments across Europe. In Switzerland, their implementation is uneven. Of the 55 certified neurorehabilitation centers in the nation, only six to seven currently employ these advanced interventions, most of which are concentrated in resource-rich urban areas such as Lausanne and Geneva (Appendix 1, Interview 6).

Additionally, while pilot programs report feasibility and practicality, older adults and individuals with limited digital literacy face substantial difficulty adopting unfamiliar technologies.<sup>46</sup> A cross-sectional survey in Geneva conducted between September 2021 to January 2022 found that older age was strongly associated with lower acceptance of video-based teleconsultations among both patients and physicians; conversely, prior experience with videoconferencing predicted greater willingness and comfort with remote care.<sup>47</sup> These disparities sharply point to the infrastructural gaps and digital literacy divide. Without more inclusive policies and proactive investment in community-level training and technology distribution, vulnerable populations of elders and residents of remote Alpine regions stay at risk of being excluded from benefits of digital neurorehabilitation.

*China: Rapid Innovation Outpacing Equitable Utilization*

China’s rapid digital transformation and its enormous population present both opportunities and challenges of achieving equitable access to technology-assisted neurorehabilitation. In October 2016, the State Council’s “Several Opinions on Accelerating the Development of the Rehabilitation and Assistive Device Industry” elevated rehabilitation technology, including VR, Artificial Intelligence (AI), brain-computer interfaces, and traditional Chinese medicine-based devices to strategic priorities, targeting an industry output of ¥700 billion by 2020. Beginning in 2019, Chinese ministries launched community leasing pilots in 35 regions to improve access to rehabilitation assistive devices. By March 2024, local governments had invested ¥586 million to build a leasing network that distributed 113,000 devices and served nearly 917,000 person-times. These efforts are locally tailored: in Changzhou, for instance, individuals under the Long-Term Care Insurance receive full device fee coverage, while low-income seniors receive annual rent subsidies of up to ¥900.<sup>48</sup>

Yet, these blueprints have outpaced practical capacity. Hospitals and community health centers remain unevenly equipped, and overall per-capita rehabilitation spending in China lags behind the U.S. The Chinese rehabilitation market for rehabilitative devices is estimated at just one-eighth the size that the U.S. market, with an assistive device service rate of only 7.3%, compared to 82% in the U.S.<sup>30</sup> Public awareness of rehabilitation options and assistive devices remains low, and there is a significant shortage of trained specialists to conduct individualized assessments.<sup>48</sup> Cultural beliefs such as “rest for a hundred days after injury (伤筋动骨一百天)”, combined with limited clinician guidance, further discourage proactive rehabilitation. Unless addressing these structural and cultural gaps, even the most advanced devices risk underutilization in the very communities, namely rural elders and lower-SES groups, that would benefit most.

Telerehabilitation has been used as a complementary strategy to relieve overcrowded hospitals and bridge urban-rural divides. Widely used digital platforms like WeChat, Alipay, and Internet hospitals permit remote consultations with experienced rehabilitation specialists. A growing array of telerehabilitation technologies, ranging from exoskeleton robotics and computer-aided neurofunction evaluation systems to VR-based training, reflects the field’s vitality.<sup>49</sup> At the policy level, the 2018 “Internet Plus Healthcare” initiative and guidelines from the National Health Security Administration have promoted insurance coverage for online services and encouraged standardization in digital care delivery.<sup>39</sup>

Nonetheless, targeted action is needed to achieve equitable access to these innovations. A survey in rural Guangdong found that although 67% of 2,101 respondents owned a smartphone or computer and 63% reported Internet access, only 14 individuals

(0.67%) had ever experienced online health services.<sup>50</sup> Another survey at a university hospital in a relatively developed urban area reported a telerehabilitation adoption rate below 20%.<sup>51</sup> These data underscore that infrastructure and device access alone are insufficient. Factors such as limited awareness of telerehabilitation's benefits, cultural hesitation, and a lack of supportive clinical and social infrastructure contribute significantly to underutilization.

## DISCUSSION & POLICY RECOMMENDATION

Neurorehabilitation requires sustained, interdisciplinary interventions that are still undervalued in most healthcare systems. This devaluation undermines both provider participation and patient recovery, disproportionately affecting marginalized communities. Drawing on the *WHO's Rehabilitation 2030 Call the Action Framework*, this study emphasizes the importance of tailoring policy reforms to country-specific barriers while integrating global insights. Below, the analysis identifies structural gaps and outlined actionable recommendations to align financing, workforce distribution, and cultural integration with equitable neurorehabilitation access.

### *United States: Affordability and Workforce Incentives*

Heavily built around private insurance, the U.S. healthcare system contains structural gaps that hinder equitable neurorehabilitation access. While Medicare and Medicaid provide a safety net for vulnerable populations, their low reimbursement rates and cost-sharing burdens deter provider participation and patient follow-through. High OOP costs, and specialist shortages in underdeveloped regions disproportionately impact low-income, elderly, and rural populations from equitable neurorehabilitation.

To bridge these gaps, the U.S. could explore bundled-payment models for chronic neurological conditions, mirroring Germany's integrated approach, covering multidisciplinary care from acute treatment through long-term rehabilitation (Appendix 1, Interview 5)). Simultaneously, increasing Medicare and Medicaid reimbursement rates, coupled with loan forgiveness and tax deduction programs for therapists practicing in underserved areas, would help redistribute the workforce and reduce access disparities. Expanding telerehabilitation and infrastructure support also holds promise for decreasing geographic disparities in neurorehabilitation access.

### *Switzerland: Reimbursement Reform and Cross-Cantonal Equity*

Switzerland's MHI ensures universal coverage but masks deep inequities in neurorehabilitation access driven by reimbursement biases and urban-rural divides. Funded through DRGs that prioritize high-volume services, acute care outcompetes long-term care and out-patient neurorehabilitation in providing better earnings and retaining therapists, leading to a professional shortage. The physician referral mandate, paired with regional variation in funding and service availability, creates fragmented access—particularly disadvantageous rural populations and those in lower-income cantons<sup>14,16</sup>.

Switzerland could adopt a more integrated payment structure, rewarding multidisciplinary teams for overall patient outcomes rather than service quantity. Inspired by Netherland's holistic care model, this could incentivize sustained care beyond isolated interventions (Appendix 1, Interview 5). Additionally, standardizing cantonal funding mechanisms and implementing flexible referral protocols for chronic neurological conditions could reduce administrative bottlenecks and improve access across regions. Addressing the urban clustering of providers, particularly among foreign-trained specialists, is vital for ensuring equitable neurorehabilitation nationwide.

### *China: Workforce Structure and Cultural Integration*

China's neurorehabilitation challenges are uniquely shaped by rapid aging, urban-rural divides, and cultural preference for informal caregiving. Although public policies and digital health reforms are advancing, many rural patients still travel long distances to overcrowded urban hospitals for neurorehabilitation services, while local clinics stay under-resourced. Workforce shortages, exacerbated by the legacy of the one-child policy and skewed gender ratios intensify these disparities. As a result, improving neurorehabilitation service from a sociocultural perspective is imperative. To bridge these gaps and achieve China's digital-health ambitions, policymakers should implement targeted public-awareness campaigns regarding the benefits of neurorehabilitation and develop digital competency programs for both healthcare professionals and the general population. Enhancing the social status and compensation of rehabilitation specialists can also attract more medical students to specialize in it (Appendix 1, Interview 8). Expanding community-based neurorehabilitation pilots and promoting medical alliances strengthen primary care networks and decentralize expertise. In addition, integrating traditional Chinese medicine and digital tools into care provision may improve uptake and acceptance in the unique cultural setting.

### *Principles for Global Health Equity*

Internationally, policy reforms targeting neurorehabilitation systems should prioritize the following three pillars:

- 1) Financial alignment: payment and reimbursement systems should transit from episodic, service-dependent nature to more outcome-based structure that rewards sustained recovery.
- 2) Workforce Distribution: rehabilitation specialists should enjoy enhanced social status and salary benefits that attract medical graduates to specialize in the field. Targeting incentives including loan forgiveness, rural stipends, and cross-regional qualifications, should be applied to redistribute professionals to underserved areas.
- 3) Cultural Integration: Digital tools, traditional practices, and community-unique characteristics should be integrated to develop culturally appropriate neurorehabilitation service, particularly in marginalized communities.

Through reforms rooted in these principles, policymakers can reframe neurorehabilitation from a privilege of wealthy, urban, and educated groups into a solid globally inclusive health service.

## CONCLUSION

This comparative study examines how health financing schemes, care-delivery hierarchies, and technology adoption collectively shape equitable access to neurorehabilitation in three distinct health-system contexts: the United States, Switzerland, and China. Drawing from policy documents, expert interviews, and a multi-domain comparison of insurance and reimbursement models, referral mechanisms, and telerehabilitation adoptions, it identified three structural domains central to access equity: insurer and payment frameworks, care-delivery hierarchies and referral processes, and technology adoption.

In each nation, these structural factors result in stratified access patterns, exacerbating the cycle of disability and financial hardships. In the U.S., high healthcare costs and fragmented state rules concentrate care among socioeconomically advantaged and urban patients. In Switzerland, universal coverage coexists with regional and financial inequities driven by shortage in outpatient service and providers clustering in urban centers. In China, the hospital-centric pattern, cultural atmosphere, and medical priorities concentrate resources in tertiary facilities and acute-care interventions limit uptake in rural and low-income populations in spite of reform efforts and digital innovation.

This study is limited from several aspects: first, while the comparative approach highlights cross-national contrasts, it relies on secondary policy reviews and selective expert perspectives that may contain bias and fail to capture every local variation. Second, the rapidly evolving field of digital health means that telerehabilitation initiatives can outpace the data available at the time of writing. Third, the focus on three countries inherently restricts the generalizability of the results to broader contexts, such as low-income countries. Nevertheless, the mechanisms identified and analyzed, including financing incentives, referral bottlenecks, workforce misallocation, and digital divides, still offer a transferable administrative framework to improve global rehabilitation equity.

Still, the study provides a holistic mapping of how distinct health-system architectures shape neurorehabilitation equity. By uncovering common policy characteristics, it informs the ways regulation frameworks mitigate structural barriers to healthcare access. These analyses provide new insights for health systems to transform neurorehabilitation into a universal bridge towards functional recovery and social reintegration for individuals suffering from neurological conditions.

Achieving truly equitable neurorehabilitation requires system-wide efforts that align financial incentives to long-term care needs, improve care coordination across hierarchies and professions, implement policies attracting specialists to underserved regions, and ensure digital tools benefit all communities. Looking ahead, future studies could evaluate the effectiveness of bundled-payment models, assess workforce redistribution strategies, and follow-up on real-world outcomes of telerehabilitation implementations, particularly in underserved communities.

## REFERENCES

1. Pimentel-Ponce M, Romero-Galisteo RP, Palomo-Carrión R, Pinero-Pinto E, Antonio Merchán-Baeza J, Ruiz-Muñoz M, et al. Gamification and neurological motor rehabilitation in children and adolescents: a systematic review. *Neurología (English Edition)*. 2024 Jan;39(1):63–83. doi:10.1016/j.nrleng.2023.12.006
2. Feigin VL, Vos T, Nichols E, Owolabi MO, Carroll WM, Dichgans M, et al. The global burden of neurological disorders: translating evidence into policy. *Lancet Neurol*. 2020 Mar;19(3):255–65. doi:10.1016/S1474-4422(19)30411-9 PubMed PMID: 31813850; PubMed Central PMCID: PMC9945815.
3. World Health Organization. (2024) Rehabilitation. <https://www.who.int/news-room/fact-sheets/detail/rehabilitation> (Accessed Apr 2025)

4. Tikkanen R, Osborn R, Mossialos E, Djordjevic A, Wharton G. International Profiles of Health Care Systems 2020. [https://www.commonwealthfund.org/sites/default/files/2020-12/International\\_Profiles\\_of\\_Health\\_Care\\_Systems\\_Dec2020.pdf](https://www.commonwealthfund.org/sites/default/files/2020-12/International_Profiles_of_Health_Care_Systems_Dec2020.pdf) (Accessed Apr 2025)
5. Bagley N, Levy H. Essential Health Benefits and the Affordable Care Act: Law and Process. *Journal of Health Politics, Policy and Law*. (2014) Apr 1;39(2):441–65. <https://doi.org/10.1215/03616878-2416325>
6. Bowman SM, Martin DP, Sharar SR, Zimmerman FJ. (2007) Racial Disparities in Outcomes of Persons With Moderate to Severe Traumatic Brain Injury. *Medical Care*. <https://doi.org/10.1097/MLR.0b013e31803dadf3>
7. Chan L, Doctor J, Temkin N, MacLehose RF, Esselman P, Bell K, et al. (2001) Discharge disposition from acute care after traumatic brain injury: The effect of insurance type. *Archives of Physical Medicine and Rehabilitation*. 82, 1151–4. [doi:10.1053/apmr.2001.24892](https://doi.org/10.1053/apmr.2001.24892)
8. Hsiang WR, Lukasiewicz A, Gentry M, Kim CY, Leslie MP, Pelker R, et al. (2019) Medicaid Patients Have Greater Difficulty Scheduling Health Care Appointments Compared With Private Insurance Patients: A Meta-Analysis. *INQUIRY* 56, 0046958019838118. <https://doi.org/10.1177/0046958019838118>
9. Gotlieb EG, Rhodes KV, Candon MK. (2021) Disparities in Primary Care Wait Times in Medicaid versus Commercial Insurance. *J Am Board Fam Med* 34(3):571–8. <https://doi.org/10.3122/jabfm.2021.03.200496>
10. Centers of Medicare & Medicaid Services. (2024) Calendar Year (CY) 2025 Medicare Physician Fee Schedule Final Rule. [https://www.cms.gov/newsroom/fact-sheets/calendar-year-cy-2025-medicare-physician-fee-schedule-final-rule#:~:text=By%20factors%20specified%20in%20law%2C%20average%20payment,were%20paid%20for%20most%20of%20CY%202024.&text=This%20amounts%20to%20an%20estimated%20CY%202025,current%20CY%202024%20conversion%20factor%20of%20\\$33.29](https://www.cms.gov/newsroom/fact-sheets/calendar-year-cy-2025-medicare-physician-fee-schedule-final-rule#:~:text=By%20factors%20specified%20in%20law%2C%20average%20payment,were%20paid%20for%20most%20of%20CY%202024.&text=This%20amounts%20to%20an%20estimated%20CY%202025,current%20CY%202024%20conversion%20factor%20of%20$33.29). (Accessed Jan 2025)
11. Collins SR, Haynes LA, Masitha R. (2022) The State of U.S. Health Insurance in 2022: Findings from the Commonwealth Fund Biennial Health Insurance Survey. <https://doi.org/10.26099/73zg-3432>
12. De Pietro C, Camenzind P, Sturny I, Crivelli L, Edwards-Garavoglia S, Spranger A, et al. (2015) Switzerland: Health System Review. *Health Syst Transit*, 17(4):1–288. *PubMed PMID: 26766626*.
13. Ballmer T, Kühne N, Petrig A, Eggenberger B, Moiola S, Gantschnig BE. (2023) The Size and Structure of the Swiss Occupational Therapy Workforce. A Survey Study. *International Journal of Health Professions* 10, 57–67. <https://doi.org/10.2478/ijhp-2023-0007>
14. Berney L, Agri F, Pignat JM, Wasserfallen JB, Diserens K. (2021) Economic impact of the Swiss Diagnosis-Related Group system on acute neurorehabilitation. *JHA* 10, 10. <https://doi.org/10.5430/jha.v10n4p10>
15. Busato A, von Below G. (2010) The implementation of DRG-based hospital reimbursement in Switzerland: A population-based perspective. *Health Res Policy Syst* 8, 31. <https://doi.org/10.1186/1478-4505-8-31>
16. Camenzind PA. (2012) Explaining regional variations in health care utilization between Swiss cantons using panel econometric models. *BMC Health Serv Res* 12, 62. <https://doi.org/10.1186/1472-6963-12-62>
17. 健闻咨询. (2024) “慢科室”的 DRG 拉锯战：越住院越亏损的窟窿，用什么填？ <https://www.yicai.com/news/102249698.html> (Accessed Apr 2025)
18. 广东省医疗保障局. (2024) 广东开展康复病种医保支付方式改革 更好保障长期康复住院患者医疗服务需求. 006940062/2024-00049 [https://hsa.gd.gov.cn/gkmlpt/content/4/4380/post\\_4380997.html#463](https://hsa.gd.gov.cn/gkmlpt/content/4/4380/post_4380997.html#463) (Accessed Apr 2025)
19. Dong J, Görgülü B, Sarhangian V. (2024) What Causes Delays in Admission to Rehabilitation Care? A Structural Estimation Approach. *Me&SOM*. 26, 465–84. <https://doi.org/10.1287/msom.2022.0377>
20. Marzolini S, Blanchard C, Alter DA, Grace SL, Oh PI. (2015) Delays in Referral and Enrolment Are Associated With Mitigated Benefits of Cardiac Rehabilitation After Coronary Artery Bypass Surgery. *Circ Cardiovascular Quality and Outcomes* 8, 608–620. <https://doi.org/10.1161/CIRCOUTCOMES.115.001751>
21. Shanmugasagaram S, Oh P, Reid RD, McCumber T, Grace SL. (2013) Cardiac rehabilitation barriers by rurality and socioeconomic status: a cross-sectional study. *Int J Equity Health* 12, 72. <https://doi.org/10.1186/1475-9276-12-72>
22. Drake M, Friedland DR, Hamad B, Marfowaa G, Adams JA, Luo J, et al. (2023) Factors associated with delayed referral and hearing rehabilitation for congenital sensorineural hearing loss. *International Journal of Pediatric Otorhinolaryngology* 175, 111770. <https://doi.org/10.1016/j.ijporl.2023.111770>
23. MassAbility. (2007) Referral, Application, Eligibility, and Order of Selection. <https://www.mass.gov/doc/107-cmr-4-referral-and-application-eligibility-and-order-of-selection/download> (Accessed Apr 2025)
24. Ohio Occupation Therapy, Physical Therapy, and Athletic Trainers Board. (2024) Referrals. OH Admin Code 4755:2-2-08.
25. Oklahoma Senate. (2024) Referrals by physicians, surgeons, or assistants thereof – Exceptions. <https://ok.senate.gov/sites/default/files/2022-05/os59.pdf> (Accessed Apr 2025)
26. Haque W, Ahmadzada M, Janumpally S, Haque E, Allahrakha H, Desai S, et al. (2022) Adherence to a Federal Hospital Price Transparency Rule and Associated Financial and Marketplace Factors. *JAMA* 327, 2143. <https://doi.org/10.1001/jama.2022.5363>

27. François M, Pfarrwaller E, Rozsnyai Z, Streit S, Zurkinden E, Rodondi N, et al. (2023) Primary care physicians in Switzerland: state of play and future directions. Swiss Academy of Family Medicine.
28. Geng F, Liu Z, Yan R, Zhi M, Grabowski DC, Hu L. (2024) Post-Acute Care in China: Development, Challenges, and Path Forward. *Journal of the American Medical Directors Association* 25, 61–68. <https://doi.org/10.1016/j.jamda.2023.09.034>
29. Ge L, Zhang X, Huang Y, Xu T, Zhao Q, Zhu T, et al. (2022) Can a multitiered copayment system affect people's healthcare-seeking behavior? A case study of Wenzhou, China. *BMC Health Serv Res* 22, 630. <https://doi.org/10.1186/s12913-022-08031-0>
30. 陈铁林, 刘闯, 王艳. (2023) 康复器械行业深度: 需求与供给共振, 业绩与估值双击. [https://pdf.djcfiv.com/pdf/H3\\_AP202307251592607347\\_1.pdf](https://pdf.djcfiv.com/pdf/H3_AP202307251592607347_1.pdf) (Accessed Apr 2025)
31. Ye Y, Evans R, Jing L, Rizwan M, Xuan Y, Lu W. (2022) The Impact of County Medical Community Reform on the Medical Service Efficiency of County-Level Public General Hospitals in China: A Case Study of Shanxi Province. *IJERPH* 19, 13827. <https://doi.org/10.3390/ijerph192113827>
32. 国家卫生健康委员会. (2024) 2023 中国卫生健康统计年鉴. Di 1 ban., 中国协和医科大学出版社, Beijing.
33. Huang Y, Tang W, Mu Y, Li X, Liu Z, Wang Y, et al. (2016) The Sex Ratio at Birth for 5,338,853 Deliveries in China from 2012 to 2015: A Facility-Based Study. Luo ZC, editor. *PLoS ONE* 11, e0167575. <https://doi.org/10.1371/journal.pone.0167575>
34. World Health Organization. (2019) Delivered by women, led by men: a gender and equity analysis of the global health and social workforce. <https://iris.who.int/handle/10665/311322> (Accessed Apr 2025)
35. Cramer SC. (2016) Interventions to Improve Recovery after Stroke, in *Stroke* 972-980, Elsevier. <https://doi.org/10.1016/B978-0-323-29544-4.00059-1>
36. Sevcenko K, Lindgren I. (2022) The effects of virtual reality training in stroke and Parkinson's disease rehabilitation: a systematic review and a perspective on usability. *Eur Rev Aging Phys Act* 19, 4. <https://doi.org/10.1186/s11556-022-00283-3>
37. Verma A, Towfighi A, Brown A, Abhat A, Casillas A. (2022) Moving Towards Equity With Digital Health Innovations for Stroke Care. *Stroke* 53, 689–697. <https://doi.org/10.1161/STROKEAHA.121.035307>
38. Département fédéral de l'intérieur DFI. (2023) Avec DigiSanté, le Conseil fédéral veut accélérer la numérisation du système de santé <https://www.bag.admin.ch/dam/bag/fr/dokumente/nat-gesundheitspolitik/foerderprogramme/DigiSant--F-rderung-digitalen-Transformation-im-Gesundheitswesen/medienmitteilung-ueberweisung-finanzierungskredit-digisante.pdf.download.pdf/Avec%20DigiSant%C3%A9,%20le%20Conseil%20f%C3%A9d%C3%A9ral%20veut%20acc%C3%A9l%C3%A9rer%20la%20num%C3%A9risation%20du%20syst%C3%A8me%20de%20sant%C3%A9.pdf> (Accessed Apr 2025)
39. Zhang Y, Wang C. (2024) Internet Plus Health Care” as an Impetus for China's Health System Reform. In: Cohen IG, Kramer DB, Adler-Milstein J, Shachar C, editors. *Digital Health Care outside of Traditional Clinical Settings: Ethical, Legal, and Regulatory Challenges and Opportunities*. 1st ed., 156-158, Cambridge University Press. p. 156–8. <https://doi.org/10.1017/9781009373234>
40. Jayarajan D, Sivakumar T, Torous JB, Thirthalli J. (2020) Telerehabilitation in Psychiatry. *Indian Journal of Psychological Medicine* 42, 57S-62S. <https://doi.org/10.1177/0253717620963202>
41. Havran MA, Bidelspach DE. (2021) Virtual Physical Therapy and Telerehabilitation. *Physical Medicine and Rehabilitation Clinics of North America* 32, 419–28. <https://doi.org/10.1016/j.pmr.2020.12.005>
42. Zhang D, Wang G, Zhu W, Thapa JR, Switzer JA, Hess DC, et al. (2018) Expansion Of Telestroke Services Improves Quality Of Care Provided In Super Rural Areas. *Health Affairs* 37, 2005–13. <https://doi.org/10.1377/blthaff.2018.05089>
43. Stephenson A, Howes S, Murphy PJ, Deutsch JE, Stokes M, Pedlow K, et al. (2022) Factors influencing the delivery of telerehabilitation for stroke: A systematic review. Javadi AH, editor. *PLoS ONE* 17, e0265828. <https://doi.org/10.1371/journal.pone.0265828>
44. Rausch AK, Baur H, Reicherzer L, Wirz M, Keller F, Opsommer E, et al. (2021) Physiotherapists' use and perceptions of digital remote physiotherapy during COVID-19 lockdown in Switzerland: an online cross-sectional survey. *Arch Physiother* 11, 18. <https://doi.org/10.1186/s40945-021-00112-3>
45. Gerber SM, Schütz N, Uslu AS, Schmidt N, Röthlisberger C, Wyss P, et al. (2019) Therapist-Guided Tablet-Based Telerehabilitation for Patients With Aphasia: Proof-of-Concept and Usability Study. *JMIR Rehabil Assist Technol* 6, e13163. <https://doi.org/10.2196/13163>
46. Gümman S, Ziller C, Paulissen N, Behrendt F, Suica Z, Crüts B, et al. (2025) START—the Swiss tele-assisted rehabilitation and training program to support transition from inpatient to outpatient care in the subacute phase after a stroke: feasibility, safety and performance evaluation. *Front Digit Health* 6, 1496170. <https://doi.org/10.3389/fgth.2024.1496170>
47. Mazouri-Karker S, Lüchinger R, Braillard O, Bajwa N, Achab S, Hudelson P, et al. (2023) Perceptions of and Preferences for Telemedicine Use Since the Early Stages of the COVID-19 Pandemic: Cross-Sectional Survey of Patients and Physicians. *JMIR Hum Factors* 10, e50740. <https://doi.org/10.2196/50740>
48. Live News. (2024) 康复辅助器具社区租赁试点 5 年 辅具共享的创新模式效果如何? [https://smzt.gd.gov.cn/mzqx/qgmz/content/post\\_4397906.html](https://smzt.gd.gov.cn/mzqx/qgmz/content/post_4397906.html) (Accessed Apr 2025)

49. Pan R, Zhan J, Zhu L, Cai H, Chen H. (2015) The development of telerehabilitation in China: a systematic survey. *Int J Integr Care* 15, 7. <https://doi.org/10.5334/ijic.2280>
50. Du Y, Zhou Q, Cheng W, Zhang Z, Hoelzer S, Liang Y, et al. (2022) Factors Influencing Adoption and Use of Telemedicine Services in Rural Areas of China: Mixed Methods Study. *JMIR Public Health Surveill* 8, e40771. <https://doi.org/10.2196/40771>
51. Wang MY, Chen H, Gong C, Peng XM, Zhong YB, Wu CM, et al. (2023) Understanding the use intention and influencing factors of telerehabilitation in people with rehabilitation needs: a cross-sectional survey. *Front Public Health* 11, 1274080. <https://doi.org/10.3389/fpubh.2023.1274080>

#### ACKNOWLEDGEMENTS

The author thanks the professors and academic advisors from Emory University and SIT: Global Health and Development Policy for fostering an intellectual environment and connecting her to a professional network. This research was made possible by the generosity of the interviewees: Dr. Guggisberg, Dr. Müller, Dr. Horný, Dr. Sokolov, Dr. Hu, and Dr. Kuang, who shared their time and insights amidst demanding schedules. Additional appreciation is extended to Dr. Korzun and Dr. Anguera for sharing their perspectives as a traveling physical therapist and researcher in the U.S.

#### ABOUT THE STUDENT AUTHOR

Linyue Lu is a junior in Emory University. She is double majoring in *Anthropology and Human Biology* and *Neuroscience and Behavioral Biology*, and she plans to graduate in Spring, 2027.

#### PRESS SUMMARY

As populations age worldwide, access to neurorehabilitation remains unequal. This study compares the regulations and implementation of neurorehabilitation in the U.S., Switzerland, and China and reveals barriers shaped by insurance policies, care delivery systems, and resource distribution. In the U.S., fragmented insurance limits access for disadvantaged groups; in Switzerland, financial incentives and referral rules create hidden inequities; and in China, hospital-centered systems and workforce shortages worsen rural gaps. While telerehabilitation shows promise in some regions, challenges of infrastructure and digital literacy persist. The study calls for aligning financial policies, care structures, and technology with principles of health equity to build more equitable neurorehabilitation systems across the globe.