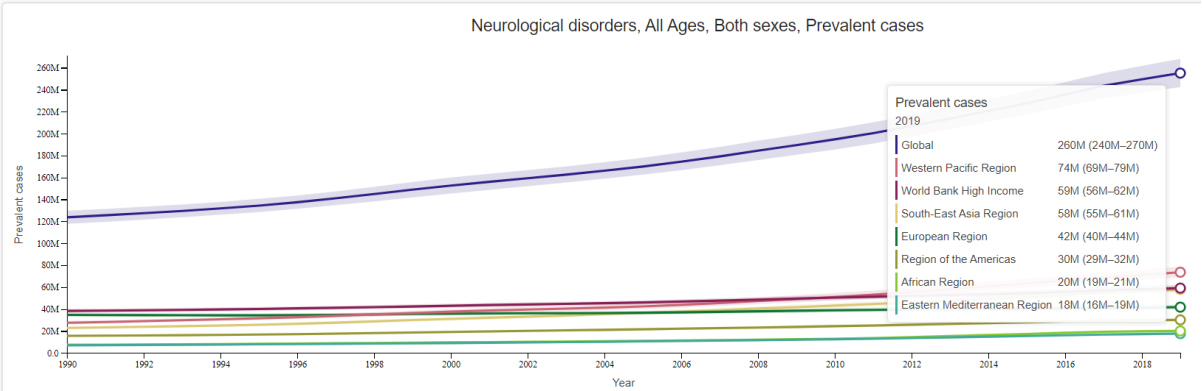
The article “Global Estimates of the Need for Rehabilitation Based on the Global Burden of Disease 2019 Study,” published in the world’s leading medical journal, The Lancet, provides the first global and regional figures on the number of people who need rehabilitation.

According to this landmark global study, developed jointly by the WHO and the Institute for Health Metrics and Evaluation (IHME), one-third of the world’s population lives with a health condition requiring rehabilitation. The need has increased by 63% since 1990, rising from 1.48 billion to 2.41 billion people.

Global estimates establish that rehabilitation is a key strategy for achieving universal health coverage in the 21st century and challenge the common perception that rehabilitation is an optional service needed only by a minority of the population. The findings highlight the urgent need to expand rehabilitation, particularly at the primary health care level, to ensure services reach those who need them. The study provides a strong argument for policymakers to prioritize rehabilitation to address the functional needs of their populations.

The WHO, along with the IHME, has developed a Rehabilitation Needs Estimator based on the study published in The Lancet. This is a web tool that provides data visualizations at the global, regional, and national levels regarding the estimated need for rehabilitation worldwide. Launched in January 2021, it allows users to access estimates on rehabilitation needs across countries, regions, health conditions, and groups of conditions.




According to this database, more than 260 million people need rehabilitation for neurological disorders, such as cerebral palsy or stroke (86 million). Among the effects caused by these conditions is the loss or degradation of motor skills, including the ability to walk or “gait,” which is essential for daily life.

This is why, in our Final Year Project, we aim to improve the quality of the gait rehabilitation process for these patients and transform this service into a more accessible one.
To achieve this, we plan to design and build a gait-tracking system that patients can use comfortably and that collects daily data. We believe this approach would make rehabilitation tracking more comprehensive, providing specialists with a much broader database to support their patients. The product would include an accompanying application to store all data and generate statistics. The parameters we would measure include the flexion angles of the knees and ankles, as well as the inclination and orientation of the hips.

| | Prevalence | | | | Years of life lived with disability | | | | Average disability weight |
|---|---|---|---|---|---|---|---|---|---|
| | All age (millions) | | Age-standardised rate (per 1000) | | All age (millions) | | Age-standardised rate (per 1000) | | |
| | 2019 | Percentage change* | 2019 | Percentage change* | 2019 | Percentage change* | 2019 | Percentage change* | 2019 |
| **Overall total** | **2412·0 (2338·0 to 2501·0)** | **63% (61 to 64)†** | **298·0 (289·0 to 309·0)** | **–5·6% (–6·1 to –5·1)†** | **310·0 (235·0 to 392·0)** | **69% (67 to 72)†** | **38·0 (29·0 to 49·0)** | **–5% (–6 to –3·9)†** | **0·13 (0·10 to 0·16)** |
| **Musculoskeletal disorders** | | | | | | | | | |
| **Musculoskeletal disorders (total)** | **1714·0 (1632·0 to 1800·0)** | **62% (60 to 64)†** | **210·0 (200·0 to 221·0)** | **–8·8% (–10 to –8·2)†** | **149·0 (108·0 to 199·0)** | **59% (55 to 64)†** | **18·0 (13·0 to 24·0)** | **–11% (–13 to –10)†** | **0·08 (0·06 to 0·11)** |
| Low back pain | 568·0 (505·0 to 641·0) | 47% (44 to 51)† | 70·0 (62·0 to 79·0) | –16% (–17 to –16)† | 64·0 (45·0 to 85·0) | 47% (43 to 51)† | 7·8 (5·5 to 10·0) | –16% (–17 to –16)† | 0·11 (0·08 to 0·15) |
| Neck pain | 223·0 (179·0 to 281·0) | 79% (70 to 87)† | 27·0 (22·0 to 34·0) | –0·45 % (–2·6 to 1·7) | 22·0 (15·0 to 32·0) | 78% (69 to 87)† | 2·7 (1·8 to 3·8) | –0·31% (–2·5 to 1·8) | 0·10 (0·07 to 0·14) |
| Fractures | 436·0 (411·0 to 465·0) | 69% (67 to 71)† | 54·0 (51·0 to 57·0) | –6·9% (–7·8 to –6·0)† | 26·0 (18·0 to 36·0) | 66% (63 to 68)† | 3·2 (2·2 to 4·4) | –8·3% (9·5 to –7·2)† | 0·06 (0·04 to 0·08) |
| Other injuries | 305·0 (282·0 to 336·0) | 43% (40 to 46)† | 38·0 (35·0 to 41·0) | –17% (–18 to –15)† | 11·0 (7·5 to 15·0) | 25% (19 to 31)† | 1·3 (0·9 to 1·8) | –24% (–27 to –21)† | 0·03 (0·02 to 0·05) |
| Osteoarthritis | 344·0 (275·0 to 414·0) | 114% (112 to 117)† | 41·0 (33·0 to 50·0) | 3·1 % (1·8 to 4·2)† | 19·0 (10·0 to 38·0) | 115% (112 to 117)† | 2·3 (1·2 to 4·5) | 3·3% (2 to 4·6)† | 0·05 (0·03 to 0·1) |
| Amputation | 176·0 (164·0 to 190·0) | 52% (50 to 55)† | 22·0 (20·0 to 23·0) | –13% (–14 to –12)† | 5·5 (3·8 to 7·7) | 36% (29 to 44)† | 0·7 (0·5to 1·0) | –23% (–27 to –18)† | 0·03 (0·02 to 0·04) |
| Rheumatoid arthritis | 13·0 (12·0 to 15·0) | 106% (104 to 109)† | 1·6 (1·5 to 1·8) | 8·1% (7·5 to 8·6)† | 2·4 (1·7 to 3·3) | 105% (102 to 108)† | 0·3 (0·2 to 0·4) | 8·3% (7·3 to 9·3)† | 0·18 (0·13 to 0·24) |
| **Neurological disorders** | | | | | | | | | |
| **Neurological disorders (total)** | **255·0 (242·0 to 268·0)** | **106% (103 to 110)†** | **32·0 (31·0 to 34·0)** | **10% (8·4 to 12)†** | **51·0 (37·0 to 65·0)** | **104% (100 to 109)†** | **6·4 (4·7 to 8·2)** | **11% (8·5 to 13)†** | **0·20 (0·15 to 0·25)** |
| Cerebral palsy | 50·0 (44·0 to 57·0) | 159% (138 to 183)† | 6·6 (5·8 to 7·6) | 94% (78 to 111)† | 11·0 (7·4 to 15·0) | 155% (134 to 178)† | 1·4 (1·0 to 1·9) | 91% (76 to 108)† | 0·21 (0·15 to 0·28) |
| Stroke | 86·0 (79·0 to 94·0) | 85% (82 to 88)† | 11·0 (10·0 to 12·0) | –6·1% (–7·3 to –4·9)† | 18·0 (13·0 to 23·0) | 89% (85 to 93)† | 2·2 (1·6 to 2·8) | –4·7% (–6·1 to –3·3)† | 0·21 (0·15 to 0·26) |
| Traumatic brain injury | 49·0 (47·0 to 51·0) | 80% (78 to 82)† | 6·0 (5·7 to 6·3) | –0·01% (–1·1 to 1·2) | 7·1 (5·0 to 10·0) | 79% (77 to 82)† | 0·9 (0·6 to 1·2) | 0·16% (–1 to 1·3) | 0·14 (0·1 to 0·2) |
| Alzheimer's disease and dementia | 52·0 (44·0 to 59·0) | 161% (156 to 166)† | 6·8 (5·9 to 7·8) | 5·7% (4·3 to 6·9)† | 7·4 (5·2 to 10·0) | 165% (159 to 171)† | 1·0 (0·7 to 1·3) | 5·5% (4 to 6·8)† | 0·14 (0·11 to 0·18) |
| Spinal cord injury | 21·0 (19·0 to 24·0) | 82% (74 to 87)† | 2·5 (2·3 to 2·9) | 5·8 % (2·7 to 10)† | 6·2 (4·5 to 8·2) | 65% (56 to 72)† | 0·8 (0·6 to 1·0) | –1·6% (–5·6 to 3·3) | 0·30 (0·22 to 0·38) |
| Parkinson's disease | 3·9 (3·3 to 4·7) | 156% (150 to 161)† | 0·5 (0·4 to 0·6) | 16% (13 to 18)† | 1·2 (0·8 to 1·6) | 155% (149 to 161)† | 0·2 (0·1 to 0·2) | 16% (13 to 19)† | 0·30 (0·21 to 0·39) |
| Multiple sclerosis | 1·4 (1·2 to 1·5) | 72% (66 to 77)† | 0·2 (0·1 to 0·2) | –6·1% (–8·7 to –3·8)† | 0·5 (0·3 to 0·6) | 71% (65 to 77)† | 0·1 (0·04 to 0·07) | –5·8% (–8·6 to –2·9)† | 0·33 (0·24 to 0·42) |
| Motor neuron disease | 0·2 (0·2 to 0·3) | 69% (62 to 76)† | 0·03 (0·02 to 0·03) | 1·9% (0·61 to 3·4)† | 0·1 (0·0 to 0·1) | 69% (62 to 76)† | 0·01 (0 to 0·01) | 1·9% (0·57 to 3·3)† | 0·25 (0·17 to 0·32) |
| Guillain-Barré syndrome | 0·1 (0·1 to 0·1) | 67% (57 to 77)† | 0·01 (0·01 to 0·02) | 6·6 % (3·6 to 10)† | 0·03 (0·02 to 0·04) | 67% (57 to 77)† | 0 (0 to 0·01) | 6·5% (3·6 to 9·5)† | 0·30 (0·20 to 0·41) |

Furthermore, the data provided by the aforementioned tool shows that musculoskeletal disorders are the leading cause of disability worldwide. Approximately 1.71 billion people live with such conditions, including lower back pain, neck pain, fractures, and other injuries—of which lower back pain is the leading cause of disability in 160 countries, affecting over 570 million people globally.

Looking ahead, we would like to expand our system's measurements to include the positioning of both the lower and upper back.