Assessing performance of the Healthcare Access and Quality Index, overall and by select age groups, for 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019

*GBD 2019 Healthcare Access and Quality Collaborators**

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Summary

Background Health-care needs change throughout the life course. It is thus crucial to assess whether health systems provide access to quality health care for all ages. Drawing from the Global Burden of Diseases, Injuries, and Risk Factors Study 2019 (GBD 2019), we measured the Healthcare Access and Quality (HAQ) Index overall and for select age groups in 204 locations from 1990 to 2019.

Methods We distinguished the overall HAQ Index (ages 0–74 years) from scores for select age groups: the young (ages 0–14 years), working (ages 15–64 years), and post-working (ages 65–74 years) groups. For GBD 2019, HAQ Index construction methods were updated to use the arithmetic mean of scaled mortality-to-incidence ratios (MIRs) and risk-standardised death rates (RSDRs) for 32 causes of death that should not occur in the presence of timely, quality health care. Across locations and years, MIRs and RSDRs were scaled from 0 (worst) to 100 (best) separately, putting the HAQ Index on a different relative scale for each age group. We estimated absolute convergence for each group on the basis of whether the HAQ Index grew faster in absolute terms between 1990 and 2019 in countries with lower 1990 HAQ Index scores than countries with higher 1990 HAQ Index scores and by Socio-demographic Index (SDI) quintile. SDI is a summary metric of overall development.

Findings Between 1990 and 2019, the HAQ Index increased overall (by 19·6 points, 95% uncertainty interval 17·9–21·3), as well as among the young (22·5, 19·9–24·7), working (17·2, 15·2–19·1), and post-working (15·1, 13·2–17·0) age groups. Large differences in HAQ Index scores were present across SDI levels in 2019, with the overall index ranging from 30·7 (28·6–33·0) on average in low-SDI countries to 83·4 (82·4–84·3) on average in high-SDI countries. Similarly large ranges between low-SDI and high-SDI countries, respectively, were estimated in the HAQ Index for the young (40·4–89·0), working (33·8–82·8), and post-working (30·4–79·1) groups. Absolute convergence in HAQ Index was estimated in the young group only. In contrast, divergence was estimated among the working and post-working groups, driven by slow progress in low-SDI countries.

Interpretation Although major gaps remain across levels of social and economic development, convergence in the young group is an encouraging sign of reduced disparities in health-care access and quality. However, divergence in the working and post-working groups indicates that health-care access and quality is lagging at lower levels of social and economic development. To meet the needs of ageing populations, health systems need to improve health-care access and quality for working-age adults and older populations while continuing to realise gains among the young.

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Introduction

The share of the global population aged 15 years and older increased from 67% in 1990 to 74% in 2019.[1,2] These shifts in age structure are forecast to continue into 2100, when 86% of the global population is expected to be older than 15 years.[1] The drugs, equipment, technology, and know-how required to effectively address the health needs of working-age populations and older adults differ from what is required to address the needs of children and adolescents because different diseases and conditions are prominent in the different age groups.[3,4] To improve health outcomes and avert premature mortality, health systems must provide access to quality health care for the working-age population and older adults while simultaneously maintaining and improving health-care access and quality for younger generations.

Existing evidence suggests that health systems in low-income and middle-income countries (LMICs) have not been primarily funded and organised around providing access to quality health care for the working-age population and older adults. Non-communicable

Research in context

Evidence before this study

The Healthcare Access and Quality (HAQ) Index, previously published in 2017 and 2018, uses 32 causes of amenable mortality to measure health-care access and quality over time in a comparable way across countries. We conducted a PubMed title and abstract search for the period of Jan 1, 1990, to Sept 15, 2020, for "amenable mortality". A total of 17 studies were found that compared amenable mortality across countries, but only previous iterations of the HAQ Index study provided estimates for all countries and territories and standardised risks that could contribute to variation not associated with health-care access and quality. Only seven studies considered amenable mortality by age group. Just two studies compared changes in amenable mortality over the life course and these studies focused only on countries in the EU and Latin America and the Caribbean, respectively. Another approach, employed by Kruk and colleagues (2018), used amenable mortality along with health-care utilisation data to assess the burden of poor-quality health care in 137 low-income and middle-income countries (LMICs).

Added value of this study

This study examines health-care access and quality in more depth than previous versions of the HAQ Index by assessing performance for the first time for three select age groups: the young (ages 0–14 years), working (ages 15–64 years), and post-working (ages 65–74 years) groups, based on the Organisation for Economic Co-operation and Development definition of the working age population (15–64 years) and the Nolte and McKee definition of maximum age for amenable mortality, 74 years. The updated 2019 HAQ Index uses a mean-weighting scheme, improving its interpretability compared with previous versions based on principal component analysis, but preserving the approach of past iterations by standardising the influence of behavioural and environmental risk factors. The HAQ Indices are computed with ranges of risk-standardised death rates and mortality-to-incidence ratios separately for each age group, such that the values indicate health-care access and quality relative to the best and worst observed over 1990–2019 in each age group. We measure absolute convergence—ie, whether countries with low 1990 HAQ Index scores had faster growth between 1990 and 2019 than countries with high 1990 HAQ Index scores. We also examined absolute convergence between high Socio-demographic Index (SDI) countries and countries in other SDI quintiles. This analysis adds to the evidence base surrounding how well countries across SDI levels have improved health-care access and quality for younger, working, and older populations over time.

Implications of all the available evidence

The HAQ Index rose in all three age groups on average but changes in the gap with high-SDI countries differed depending on the age group. Absolute convergence was most substantial among 0–14-year-olds; the absolute difference with the average HAQ Index score in high-SDI quintile countries declined (showing convergence) for the high-middle, middle, and low-middle SDI countries. Among the working and post-working age groups, the average gap with the high-SDI-quintile countries declined only in middle-SDI-quintile countries, remaining unchanged or growing in the other quintiles. Growing distance between low-SDI countries and the highest HAQ Index for the working and post-working groups in particular is concerning because the population aged 15 years and older is forecast to comprise 86% of the population worldwide by 2100 and 57% of the population in these countries by 2100. Health systems in LMICs might have more difficulty addressing the health-care needs of populations aged 15 years and older because of a lack of funding directed towards the non-communicable diseases that affect these populations most. To meet the health-care needs of all ages, health systems need to hasten progress in providing access to quality health care for individuals aged 15 years and older while maintaining progress among younger groups.

diseases (NCDs) affect adults more than children and adolescents—98% of NCD deaths were among populations aged 15 years and older in 2019.[5] A number of NCDs are also risk factors for severe COVID-19 cases, hospitalisation, and death.[6–11] A growing body of evidence suggests that health systems in LMICs are lagging with respect to NCD care. Less than 2% of the US$40 billion in development assistance for health disbursed annually in LMICs focuses on NCDs.[12] There is also increasing evidence that these countries have invested a substantial share of government funds for health in areas other than NCDs (eg, HIV/AIDS, malaria, and tuberculosis),[12] suggesting NCD investments might not have kept pace with the growing burden of NCDs. Using inputs to the universal health coverage effective coverage index, effective coverage of a representative set of NCD interventions is lower on average than coverage of child, maternal, and infectious disease interventions until economic and social development is high.[13,14] However, the extent to which less investment and low service coverage for NCDs translates into higher rates of amenable mortality for the population that is of working age or older is currently unclear.

Amenable mortality, or deaths from causes that should not occur in the presence of high-quality health care,[15,16] has been used as a measure of the health-care dimension of health system performance for nearly 50 years.[15–42] The most widely used list of causes of mortality amenable to health care was developed by Nolte and McKee, and has since been used to compare high-income countries' performances at length.[10,18,20–37] A recent study by Kruk and colleagues[34] used case-fatality rates for causes

included in the McKee and Nolte list and additional diseases to estimate the separate effects of utilisation versus quality for 137 countries. The only studies that are global in scope, however, are the Healthcare Access and Quality (HAQ) Index studies, developed as part of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD).[23,24] The HAQ Index is also the only approach that makes estimates of health-care access and quality comparable across locations using risk-standardised death rates (RSDRs) and mortality-to-incidence ratios (MIRs), as a way of excluding drivers not connected to the health system.

A small number of existing studies have compared countries using amenable mortality across the life course, although these only focus on a subset of countries and territories.[15,22,32,40–42] Using amenable mortality, existing evidence suggests European countries improved health-care access and quality most for children and adolescents, with substantially bigger declines in amenable mortality estimated for these age groups as compared with older populations.[15] Past studies on amenable mortality by age have engaged the debate about the possibility of convergence in mortality and life expectancy.[38,43,44] Convergence in amenable mortality could be an indication of the diffusion of health-care technology (eg, pharmaceuticals and equipment) and know-how from health systems at the frontier of health-care access and quality to those operating less effectively. Alternatively, wider trends in social and economic development might be more important drivers of improved health-care access and quality through improved ability to pay, investment in health, better education, and other factors.[45–47]

This study extends previous research on the HAQ Index and investigates health-care access and quality over the life course. Our research questions focused on: (1) how much does health-care access and quality differ across age, and (2) to what extent is there convergence or divergence in health-care access and quality over time by age? We address these questions by computing the HAQ Index separately for three select age groups: young (ages 0–14 years), working (ages 15–64 years), and post-working (65–74 years). We grouped populations on the basis of the Organisation for Economic Co-operation and Development (OECD) definition of working age population (15–64 years) and the age limit (75 years) beyond which deaths were not amenable to health care used by Nolte and McKee.[25,26,48] With its expanded data inputs and methodological advances, the GBD 2019 study enabled the improved estimation of the HAQ Index,[5] allowing us to produce the HAQ Index for 204 countries and territories between 1990 and 2019 based on scaled MIRs and RSDRs for 32 causes of death that should not occur in the presence of timely, quality health care. We use the updated index to examine convergence stratified for each age group. For each age group, we considered: whether the HAQ Index grew faster in countries with lower 1990 scores; whether variation in the HAQ Index declined; and whether, between 1990 and 2019, average HAQ Index scores grew closer to scores in top-performing countries, as grouped by social and economic development. This manuscript was produced as part of the GBD Collaborator Network and in accordance with the GBD Protocol.[49]

Methods

Overview

The 2019 HAQ Index supersedes and improves upon previous versions of the HAQ Index.[23,24] First, the 2019 HAQ Index draws mortality, incidence, and risk factor estimates from GBD 2019 to generate MIRs and RSDRs, which represent mortality amenable to health-care access and quality. GBD 2019 improved upon previous GBD iterations by adding a substantial amount of new data, using more standardised cross-walking methods, improving redistribution algorithms, processing clinical informatics data to reflect differential access to health-care facilities across locations, and adding new systematic reviews for risk–outcome pairs, among other improvements.[5,50] Further information on data additions and cause-specific modelling updates (eg, cancers, tuberculosis) can be found in the appendix (pp 59–169) and the GBD 2019 capstone series. Second, in addition to an overall HAQ Index, we estimated the index for three select age groups: young, working age, and post-working age. Third, we expanded the list of causes for which we used MIRs rather than RSDRs, thereby better representing causes for which health-care quality and access do not affect incidence or for which detection and diagnosis is poor in some settings. Finally, we used the arithmetic mean of scaled causes of amenable mortality rather than using principal component analysis weights, improving interpretability but preserving nearly all the cross-country variation of previous versions of the HAQ Index (appendix pp 15–30). The HAQ Index is also one of the most commonly used covariates in the GBD study.

See Online for appendix

This analysis complies with the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) statement,[51] with further information provided in the appendix (pp 11–13).

Mapping the Nolte and McKee amenable cause list to GBD causes

The first step in our analysis was to identify amenable mortality,[34] or mortality that should not be present in locations where health care is accessed and of good quality.[15,25,26,29] From the list of 34 causes of amenable mortality created by Nolte and McKee,[15,25,26] we used International Classification of Diseases codes to identify 32 corresponding to causes in the GBD cause list (appendix p 20). Only deaths caused by benign prostatic hyperplasia and thyroid diseases were omitted because GBD includes these causes in a broader residual cause

group. Nolte and McKee's residual category "all respiratory diseases" was disaggregated and mapped onto "upper respiratory infections" and "lower respiratory infections". The Nolte and McKee category "other infections" was disaggregated into diphtheria and tetanus.

Age groupings

In addition to the overall HAQ Index (ages 0–74 years), we grouped populations into three select age groups: young (ages 0–14 years), working (ages 15–64 years), and post-working (ages 65–74 years) according to the OECD definition of the working age population (15–64 years). Groupings aim to distinguish health-care access and quality tied to employment (if any), versus access to quality health care enabled by social health insurance coverage related to ageing (among those aged 65 years and older), and from access to child health care and quality (for those younger than 15 years). We cap the amenable age range at 75 years to be consistent with the maximum identified by Nolte and McKee.[15,25] Additionally, some causes of amenable mortality identified by Nolte and McKee do not pertain to all age groups (appendix p 20).

Risk-standardised death rates and mortality-to-incidence ratios

As in previous HAQ Index studies, we standardised death rates to account for environmental and behavioural risk factors to isolate differences in health-care access and quality from differences due to background risk exposure. We risk-standardised death rates by removing the joint effects of location-specific behavioural and environmental risk factors and replacing them with the global background risk for all locations.[52] In other words, we eliminated differences across locations due to underlying health risk not related to the health system by setting risks in all locations to the same, global level of risk exposure. Additional information on risk-standardisation is available in the appendix (pp 16–17). Risk-standardisation was used for 20 of the 32 causes of amenable mortality in the analysis (appendix p 20). Five of the 20 causes (tetanus, appendicitis, congenital heart anomalies, adverse effects of medical treatment, and inguinal, femoral, and abdominal hernia) had no attributable risks to standardise and the observed death rate was used.

For other causes, we used MIRs, which provide an approximation of the impact of health-care access and quality on averting death once a disease is developed. We considered MIRs (1) for chronic conditions where incidence of disease is not amenable to health-care access and quality, and (2) when low mortality rates are an indication of inadequate detection, such as for cancer.[53] We determined which metric to use on the basis of the convergent validity of amenable mortality with a general summary of health, healthy life expectancy (HALE).[54] The rationale is that the form of the death metric most correlated with health-care access and quality will be more correlated with HALE. We selected MIRs when the Pearson correlation was higher for MIR and HALE than RSDRs and HALE (appendix pp 31–32).

Using the amenable age range for a given cause, GBD population estimates were used to age-standardise the MIRs and RSDRs.[2] Different age structures in the age group analysis were accounted for by rescaling age weights to sum to 1 within each age group.

Constructing the HAQ Index

To construct the HAQ Index, an offset of one death per million was added to age-group-specific MIRs and RSDRs to address the existence of zeroes for age–cause combinations in some countries. All RSDRs and MIRs were subsequently log-transformed. Next, the 1st percentile and 99th percentile of estimates were used to set 0 and 100, respectively, for each of the 32 causes, where 0 is the highest (worst) MIR or RSDR and 100 is the lowest (best) values. Calculations were done separately for each cause (32) and HAQ Index group (four) across all estimates, countries, and years. Because health-care access and quality has generally improved over time, the worst (lowest) MIRs and RSDRs for each cause and age category combination are generally from earlier years and the best (highest) are generally in later years of the time series.

Finally, the updated version of the HAQ Index takes the arithmetic mean of all the scaled causes. The advantage of using the mean rather than weighting inputs based on their variation across time and countries using principal component analysis is that the mean of all scaled causes is easier to interpret. The mean-weighted HAQ Index is highly correlated with previous principal component analysis-weighted versions of the HAQ Index (Pearson correlation coefficient of 0·99, appendix pp 23–26).

Because each MIR and RSDR was calculated separately for each age group and cause, the final HAQ Indices represent the value between the best and worst performers within each group. The HAQ Index values for each grouping are not on the same scale. The rationale for separate scaling is that outcome measures for different age groups do not represent the same health-care access and quality performance. Therefore, the respective indices should be conceptualised as health systems' health-care access and quality relative to worst performers and best performers within each age group across the entire 1990–2019 period.

Examining changes over time and convergence

We examined evidence of convergence in the HAQ Index for each age group with three approaches. We used countries' Socio-demographic Index (SDI),[55] a summary measure of income per person, fertility rates, and average educational attainment, to represent the role of social and economic development in these changes. First, we

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
Global	**54·4 (53·1 to 55·7)**	**64·5 (62·9 to 66·0)**	**55·9 (54·3 to 57·5)**	**51·2 (49·6 to 52·8)**	**19·6 (17·9 to 21·3)**	**22·5 (19·9 to 24·7)**	**17·2 (15·2 to 19·1)**	**15·1 (13·2 to 17·0)**
High SDI	83·4 (82·4 to 84·3)	89·0 (88·2 to 89·8)	82·8 (81·6 to 83·7)	79·1 (77·7 to 80·2)	15·1 (14·3 to 15·9)	11·4 (10·8 to 12·1)	15·0 (14·0 to 16·0)	16·7 (15·6 to 17·8)
High-middle SDI	70·0 (68·8 to 71·2)	79·3 (78·2 to 80·4)	69·6 (68·0 to 71·0)	64·7 (63·0 to 66·2)	17·8 (16·5 to 19·1)	17·7 (16·3 to 19·1)	16·4 (14·9 to 17·8)	15·1 (13·6 to 16·6)
Middle SDI	60·9 (58·7 to 63·0)	68·2 (66·5 to 69·9)	62·7 (60·0 to 65·4)	59·9 (56·4 to 63·5)	25·9 (23·2 to 28·8)	28·4 (26·2 to 30·3)	22·9 (19·0 to 26·7)	22·0 (17·2 to 26·4)
Low-middle SDI	39·0 (36·4 to 41·7)	50·1 (47·2 to 53·1)	41·0 (37·7 to 44·5)	37·8 (34·2 to 41·6)	17·5 (14·1 to 20·7)	20·8 (15·2 to 24·9)	15·0 (11·1 to 19·2)	13·2 (9·4 to 17·5)
Low SDI	30·7 (28·6 to 33·0)	40·4 (37·1 to 44·0)	33·8 (31·0 to 36·6)	30·4 (27·8 to 33·0)	11·8 (9·1 to 14·3)	15·9 (10·2 to 20·6)	9·7 (6·8 to 12·6)	6·8 (4·3 to 9·5)
Central Europe, eastern Europe, and central Asia	**61·5 (59·6 to 63·4)**	**72·6 (70·6 to 74·3)**	**61·2 (58·7 to 63·5)**	**59·3 (56·9 to 61·6)**	**14·5 (12·2 to 16·9)**	**15·8 (13·9 to 17·8)**	**11·0 (8·5 to 13·6)**	**12·1 (9·8 to 14·5)**
Central Asia	49·2 (47·6 to 50·8)	62·3 (59·5 to 64·7)	50·6 (49·5 to 51·8)	49·6 (48·0 to 51·1)	10·2 (7·8 to 12·5)	14·9 (12·1 to 17·4)	6·0 (3·9 to 7·9)	3·7 (1·7 to 5·6)
Armenia	63·2 (61·1 to 65·5)	76·8 (74·3 to 78·8)	61·7 (58·8 to 64·6)	55·0 (51·2 to 58·9)	13·6 (11·1 to 16·5)	12·9 (9·9 to 15·9)	9·5 (6·5 to 12·8)	6·1 (2·2 to 10·0)
Azerbaijan	53·3 (49·7 to 56·6)	62·6 (57·7 to 66·7)	57·4 (55·0 to 59·8)	54·9 (51·2 to 58·2)	15·2 (11·5 to 18·5)	15·9 (11·3 to 20·2)	12·3 (8·7 to 15·6)	6·0 (1·6 to 10·1)
Georgia	57·7 (55·7 to 60·0)	71·1 (68·6 to 73·7)	56·0 (53·1 to 58·8)	52·7 (49·6 to 55·9)	5·6 (2·9 to 8·6)	11·4 (8·2 to 14·8)	0·5 (–2·9 to 4·4)	0·4 (–3·4 to 4·2)
Kazakhstan	59·5 (57·4 to 61·5)	72·0 (69·2 to 74·9)	56·1 (53·5 to 58·6)	52·5 (49·6 to 55·7)	14·2 (11·7 to 16·6)	15·4 (12·3 to 18·6)	11·5 (8·4 to 14·2)	7·3 (3·7 to 10·5)
Kyrgyzstan	54·2 (52·2 to 56·1)	68·5 (66·5 to 70·6)	53·4 (51·0 to 55·9)	54·8 (51·9 to 57·7)	13·5 (11·2 to 15·6)	14·6 (12·2 to 16·9)	10·4 (7·7 to 13·1)	8·2 (4·9 to 11·6)
Mongolia	47·4 (43·7 to 51·2)	61·8 (57·4 to 66·3)	45·3 (41·5 to 49·3)	45·6 (41·3 to 49·8)	19·2 (14·1 to 23·6)	26·9 (22·3 to 31·1)	14·0 (8·2 to 18·7)	12·6 (6·7 to 17·9)
Tajikistan	42·5 (39·6 to 45·7)	56·9 (53·4 to 60·6)	45·8 (43·0 to 48·9)	42·8 (39·0 to 46·8)	6·0 (2·5 to 9·2)	10·9 (7·1 to 14·7)	3·6 (0·1 to 7·2)	–3·7 (–8·5 to 1·0)
Turkmenistan	48·7 (45·7 to 51·5)	59·1 (55·7 to 62·7)	48·7 (45·2 to 52·1)	53·8 (49·8 to 57·5)	9·9 (6·3 to 13·2)	13·2 (9·8 to 16·5)	5·7 (1·6 to 9·6)	7·5 (2·9 to 12·0)
Uzbekistan	49·0 (46·8 to 51·4)	64·9 (62·2 to 67·7)	48·4 (45·9 to 51·1)	47·6 (44·7 to 50·7)	8·3 (5·3 to 11·4)	11·5 (8·2 to 14·7)	3·9 (0·7 to 7·4)	0·1 (–3·5 to 3·6)
Central Europe	71·2 (68·8 to 73·5)	82·0 (80·7 to 83·3)	70·2 (67·5 to 72·9)	64·1 (61·4 to 66·8)	21·9 (19·3 to 24·6)	21·8 (19·9 to 23·9)	18·6 (15·8 to 21·7)	17·1 (14·5 to 20·0)
Albania	67·5 (63·7 to 71·1)	62·6 (58·5 to 66·9)	74·8 (70·0 to 78·8)	67·9 (62·7 to 72·8)	22·2 (17·8 to 26·8)	18·3 (14·1 to 23·5)	19·0 (14·0 to 23·3)	20·4 (14·4 to 26·2)
Bosnia and Herzegovina	68·6 (65·0 to 72·1)	78·2 (76·3 to 80·2)	71·0 (66·4 to 75·0)	62·6 (57·8 to 67·3)	17·4 (13·5 to 21·2)	14·0 (11·3 to 16·8)	18·0 (13·4 to 22·4)	15·8 (10·8 to 20·7)
Bulgaria	64·9 (61·1 to 68·1)	78·7 (75·8 to 81·3)	60·3 (56·0 to 64·1)	59·1 (54·2 to 63·2)	10·6 (6·6 to 14·3)	14·5 (11·6 to 17·1)	8·0 (3·5 to 12·2)	10·4 (5·6 to 14·9)
Croatia	81·4 (77·8 to 84·5)	89·8 (87·4 to 92·0)	81·6 (77·3 to 85·1)	73·0 (68·5 to 76·8)	16·9 (13·3 to 20·4)	12·2 (9·7 to 14·5)	18·0 (13·7 to 21·8)	18·3 (13·7 to 22·6)
Czechia	81·5 (78·4 to 84·1)	92·3 (90·0 to 94·4)	80·2 (76·6 to 83·1)	70·5 (66·6 to 74·1)	21·8 (18·4 to 24·8)	16·7 (14·3 to 19·2)	22·5 (18·8 to 25·8)	19·3 (15·0 to 23·5)
Hungary	74·4 (70·8 to 77·4)	87·7 (85·2 to 89·9)	71·3 (67·5 to 74·7)	64·8 (60·7 to 68·4)	19·4 (15·6 to 22·7)	16·2 (13·3 to 19·1)	19·3 (15·3 to 22·9)	16·1 (11·8 to 20·3)
Montenegro	76·1 (73·6 to 78·2)	85·5 (83·6 to 87·5)	75·7 (73·0 to 78·0)	70·6 (67·6 to 73·3)	9·0 (6·1 to 11·8)	13·6 (11·2 to 15·8)	7·1 (4·2 to 9·8)	2·4 (–1·2 to 6·0)
North Macedonia	67·7 (64·3 to 70·7)	77·1 (74·7 to 79·3)	71·0 (67·1 to 74·6)	64·6 (60·5 to 68·3)	18·0 (14·4 to 21·6)	20·4 (17·6 to 23·1)	14·2 (10·0 to 18·0)	12·5 (7·7 to 17·0)
Poland	73·2 (68·7 to 77·7)	87·2 (85·0 to 89·4)	70·6 (65·1 to 76·1)	63·3 (57·6 to 69·0)	22·0 (17·4 to 26·5)	19·5 (17·3 to 22·0)	21·4 (15·8 to 26·9)	19·7 (14·4 to 25·3)
Romania	69·7 (67·2 to 72·1)	81·2 (79·3 to 82·9)	67·3 (64·0 to 70·4)	63·2 (59·1 to 66·7)	21·6 (18·2 to 24·8)	22·0 (19·3 to 24·8)	18·8 (14·3 to 22·9)	13·5 (9·6 to 17·5)

(Table continues on next page)

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Serbia	72·2 (68·4 to 75·3)	86·5 (84·8 to 88·2)	72·3 (67·8 to 76·2)	63·6 (59·1 to 67·6)	20·0 (16·1 to 23·8)	23·1 (20·3 to 25·8)	16·4 (11·8 to 20·7)	13·3 (8·3 to 18·2)
Slovakia	73·4 (69·5 to 76·9)	84·7 (82·4 to 87·1)	73·0 (68·7 to 76·9)	67·1 (62·6 to 71·3)	17·3 (13·3 to 21·1)	14·1 (11·3 to 16·7)	18·4 (13·9 to 22·5)	14·4 (9·2 to 19·3)
Slovenia	87·8 (84·7 to 90·4)	95·7 (93·7 to 97·3)	87·1 (83·2 to 90·1)	76·4 (71·7 to 80·9)	21·5 (17·0 to 26·0)	15·8 (13·7 to 17·7)	22·5 (16·8 to 28·5)	23·3 (16·5 to 30·9)
Eastern Europe	66·6 (63·7 to 69·7)	81·2 (79·2 to 83·0)	62·6 (58·3 to 66·6)	59·5 (55·9 to 63·3)	14·0 (10·9 to 17·4)	15·3 (13·3 to 17·1)	11·4 (7·3 to 15·5)	10·4 (6·8 to 14·1)
Belarus	71·2 (67·3 to 74·7)	85·0 (82·8 to 87·3)	66·1 (61·8 to 70·1)	64·6 (59·7 to 69·0)	16·0 (11·5 to 20·0)	14·8 (11·9 to 17·7)	13·0 (7·8 to 17·8)	13·5 (8·3 to 18·5)
Estonia	76·4 (73·8 to 79·1)	90·7 (88·7 to 92·5)	73·1 (69·6 to 76·4)	67·2 (62·9 to 71·8)	19·2 (15·7 to 22·7)	14·2 (12·2 to 16·4)	20·0 (15·4 to 24·1)	17·5 (12·1 to 22·6)
Latvia	69·5 (67·1 to 71·6)	85·7 (83·5 to 87·6)	65·1 (62·5 to 67·5)	61·8 (58·4 to 64·9)	12·9 (9·6 to 15·7)	10·1 (8·1 to 12·1)	12·6 (8·6 to 16·1)	12·4 (7·4 to 16·6)
Lithuania	67·9 (65·5 to 70·6)	84·7 (82·8 to 86·4)	63·5 (60·3 to 66·8)	60·3 (56·9 to 63·9)	10·3 (7·1 to 13·3)	9·4 (7·3 to 11·3)	10·2 (5·8 to 14·1)	8·3 (4·1 to 12·5)
Moldova	63·7 (61·8 to 65·6)	78·3 (76·3 to 80·2)	60·2 (57·8 to 62·8)	58·8 (55·8 to 61·8)	14·0 (11·6 to 16·5)	13·1 (10·3 to 16·1)	12·7 (9·9 to 15·6)	8·1 (5·2 to 11·2)
Russia	67·6 (63·8 to 71·5)	80·8 (78·6 to 82·8)	65·2 (60·1 to 70·2)	59·3 (54·6 to 64·2)	15·7 (11·8 to 19·8)	16·2 (14·1 to 18·2)	14·2 (9·0 to 19·4)	11·5 (6·9 to 16·3)
Ukraine	63·1 (58·1 to 68·0)	79·7 (77·4 to 81·8)	55·9 (49·6 to 62·1)	62·4 (56·0 to 68·1)	6·1 (0·9 to 11·0)	7·7 (5·1 to 10·1)	1·4 (−5·1 to 7·4)	7·5 (1·2 to 13·3)
High-income	**83·9 (82·6 to 85·0)**	**87·9 (86·8 to 88·9)**	**84·4 (82·8 to 85·7)**	**80·3 (78·5 to 81·9)**	**16·6 (15·6 to 17·7)**	**13·7 (12·8 to 14·5)**	**15·5 (14·3 to 16·6)**	**18·8 (17·5 to 20·2)**
Australasia	89·6 (87·7 to 91·0)	92·3 (90·9 to 93·6)	89·7 (87·3 to 91·2)	86·5 (84·2 to 88·4)	14·7 (13·0 to 16·2)	9·6 (8·2 to 11·2)	14·7 (12·5 to 16·5)	19·8 (17·4 to 22·0)
Australia	90·2 (88·1 to 91·7)	92·5 (90·9 to 93·9)	90·4 (87·7 to 92·0)	87·1 (84·3 to 89·3)	14·4 (12·4 to 16·0)	8·9 (7·3 to 10·7)	14·2 (11·8 to 16·1)	19·9 (17·1 to 22·4)
New Zealand	85·5 (83·3 to 87·7)	90·3 (88·7 to 91·8)	84·9 (82·2 to 87·4)	82·1 (78·9 to 84·7)	14·4 (12·0 to 16·7)	11·6 (9·8 to 13·4)	14·9 (12·2 to 17·4)	17·0 (13·8 to 19·9)
High-income Asia Pacific	86·8 (85·7 to 87·8)	88·7 (87·7 to 89·8)	88·7 (87·2 to 89·9)	84·9 (83·3 to 86·3)	20·9 (19·4 to 22·2)	17·5 (15·8 to 19·3)	19·8 (18·2 to 21·3)	21·6 (19·6 to 23·2)
Brunei	57·0 (54·5 to 59·0)	71·0 (68·4 to 73·4)	58·3 (56·3 to 60·3)	51·4 (48·1 to 54·5)	13·7 (10·7 to 16·6)	9·8 (6·3 to 13·3)	14·9 (12·0 to 18·1)	16·1 (11·8 to 20·3)
Japan	87·5 (86·3 to 88·4)	89·7 (88·6 to 91·2)	88·9 (87·1 to 90·2)	84·9 (82·9 to 86·3)	14·6 (13·1 to 15·7)	10·7 (9·4 to 12·1)	14·0 (12·2 to 15·4)	17·0 (14·7 to 18·9)
Singapore	86·2 (84·4 to 87·6)	91·6 (89·8 to 93·0)	86·0 (83·5 to 88·0)	80·6 (77·9 to 83·0)	25·2 (23·3 to 27·0)	20·7 (18·4 to 22·9)	25·9 (23·3 to 28·2)	25·5 (22·3 to 28·4)
South Korea	86·3 (84·9 to 87·6)	88·5 (86·6 to 90·5)	88·5 (86·7 to 89·9)	84·9 (82·6 to 86·9)	35·8 (33·8 to 37·6)	26·8 (24·2 to 29·5)	35·9 (34·0 to 37·6)	38·5 (35·2 to 41·8)
High-income North America	81·6 (79·8 to 83·2)	87·0 (85·8 to 88·1)	80·4 (78·2 to 82·2)	79·2 (77·1 to 81·1)	9·0 (7·4 to 10·6)	7·4 (6·6 to 8·3)	8·6 (6·6 to 10·5)	11·5 (9·5 to 13·2)
Canada	90·7 (88·6 to 92·2)	92·9 (91·3 to 94·2)	91·4 (88·8 to 93·1)	85·8 (82·2 to 88·6)	11·5 (9·6 to 13·1)	8·0 (6·3 to 9·7)	12·7 (10·3 to 14·8)	15·8 (12·6 to 18·5)
Greenland	62·7 (58·6 to 66·4)	74·9 (70·3 to 79·3)	63·3 (59·4 to 66·8)	58·2 (54·6 to 62·0)	15·4 (11·0 to 19·8)	17·2 (11·8 to 22·3)	14·0 (9·6 to 18·2)	13·5 (9·6 to 17·9)
USA	80·6 (78·6 to 82·3)	86·3 (85·1 to 87·4)	79·1 (76·7 to 81·1)	78·5 (76·3 to 80·4)	8·5 (6·7 to 10·2)	7·1 (6·3 to 8·1)	8·0 (5·7 to 10·0)	10·9 (8·8 to 12·8)
Southern Latin America	62·4 (60·1 to 64·5)	75·0 (73·2 to 76·5)	62·8 (59·5 to 65·6)	57·0 (53·6 to 60·4)	15·8 (13·7 to 17·7)	16·4 (14·4 to 18·2)	14·7 (11·9 to 17·4)	13·7 (10·5 to 16·9)
Argentina	59·9 (57·4 to 62·1)	73·2 (71·3 to 74·9)	60·1 (56·8 to 63·1)	55·7 (51·8 to 59·3)	14·1 (11·9 to 16·2)	15·8 (13·6 to 17·8)	12·2 (9·3 to 15·2)	10·2 (6·6 to 13·9)
Chile	70·9 (68·7 to 72·7)	81·1 (78·8 to 83·2)	71·3 (68·2 to 74·0)	63·3 (59·5 to 66·8)	21·9 (20·0 to 23·7)	17·8 (15·2 to 20·3)	22·4 (19·5 to 25·0)	23·0 (19·6 to 26·5)
Uruguay	64·7 (62·6 to 66·6)	75·7 (73·3 to 78·0)	64·6 (61·3 to 67·6)	57·9 (54·2 to 61·4)	12·3 (10·4 to 14·2)	12·3 (9·5 to 15·0)	11·3 (8·5 to 14·1)	11·7 (8·3 to 15·4)

(Table continues on next page)

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Western Europe	87·2 (85·7 to 88·7)	92·9 (91·8 to 94·0)	88·0 (86·1 to 89·6)	76·3 (74·0 to 78·5)	18·3 (17·1 to 19·4)	14·0 (13·1 to 15·1)	18·6 (17·0 to 20·0)	19·3 (17·4 to 21·3)
Andorra	89·1 (85·8 to 92·1)	94·5 (92·9 to 96·1)	90·5 (87·0 to 93·7)	79·3 (74·5 to 83·8)	13·5 (8·9 to 19·0)	13·7 (10·4 to 16·9)	11·8 (6·8 to 17·3)	11·5 (4·7 to 19·8)
Austria	88·0 (85·8 to 89·8)	94·6 (92·8 to 96·2)	88·1 (85·5 to 90·1)	78·8 (75·4 to 81·9)	17·1 (15·0 to 19·0)	12·8 (11·0 to 14·7)	18·2 (15·6 to 20·5)	18·2 (14·9 to 21·4)
Belgium	86·6 (84·1 to 88·7)	91·6 (90·0 to 92·9)	87·8 (84·6 to 90·3)	76·5 (72·7 to 79·9)	14·4 (12·0 to 16·5)	10·9 (9·1 to 12·7)	15·2 (12·1 to 17·8)	15·2 (11·5 to 18·5)
Cyprus	86·2 (84·5 to 87·7)	92·1 (89·8 to 94·1)	88·0 (86·4 to 89·5)	75·2 (73·0 to 77·5)	23·3 (20·9 to 25·7)	17·7 (14·6 to 20·9)	23·6 (21·1 to 25·8)	22·2 (18·5 to 25·9)
Denmark	85·5 (83·4 to 87·4)	94·1 (92·6 to 95·6)	85·7 (82·7 to 88·1)	73·8 (70·3 to 77·1)	16·1 (13·9 to 18·0)	11·4 (9·4 to 13·5)	17·9 (14·8 to 20·7)	17·4 (13·5 to 20·9)
Finland	87·7 (85·5 to 89·5)	96·7 (95·2 to 98·1)	85·9 (83·2 to 87·7)	78·9 (75·7 to 81·7)	19·1 (17·0 to 20·9)	12·3 (10·6 to 14·0)	20·4 (17·6 to 22·8)	23·0 (19·7 to 25·9)
France	88·0 (85·5 to 90·2)	92·7 (91·1 to 93·9)	88·8 (85·6 to 91·2)	78·5 (74·8 to 82·0)	19·3 (16·8 to 21·5)	13·2 (11·4 to 15·0)	18·6 (15·4 to 21·1)	21·1 (17·5 to 24·6)
Germany	87·0 (84·3 to 89·2)	94·7 (93·1 to 96·1)	87·3 (84·2 to 89·7)	75·4 (71·6 to 78·9)	19·0 (16·5 to 20·9)	12·7 (11·2 to 14·2)	19·6 (16·8 to 21·7)	18·3 (14·9 to 21·6)
Greece	83·9 (81·4 to 85·9)	90·7 (89·0 to 92·1)	84·4 (81·4 to 86·8)	74·9 (71·4 to 78·3)	8·3 (6·0 to 10·4)	6·8 (5·0 to 8·9)	8·3 (5·4 to 11·1)	12·5 (8·9 to 15·8)
Iceland	93·1 (91·3 to 94·4)	96·1 (92·8 to 98·6)	92·9 (91·5 to 93·8)	84·2 (82·4 to 85·9)	15·2 (13·0 to 17·2)	10·1 (6·4 to 13·4)	15·1 (13·1 to 17·0)	19·8 (16·9 to 22·4)
Ireland	90·1 (88·0 to 91·5)	95·8 (94·2 to 97·2)	90·7 (87·9 to 92·4)	78·4 (75·0 to 81·2)	19·7 (17·8 to 21·4)	11·9 (10·1 to 13·7)	21·6 (19·2 to 23·7)	23·0 (19·3 to 26·4)
Israel	83·1 (80·6 to 85·1)	89·2 (87·4 to 90·8)	83·7 (80·6 to 86·2)	74·0 (70·3 to 77·3)	17·4 (15·1 to 19·5)	14·1 (12·1 to 16·0)	16·5 (13·6 to 19·3)	18·7 (14·9 to 22·1)
Italy	89·6 (87·7 to 90·8)	92·2 (90·9 to 93·3)	91·0 (88·8 to 92·4)	79·5 (76·8 to 81·7)	16·9 (15·0 to 18·4)	15·3 (13·5 to 17·4)	16·4 (14·3 to 18·0)	18·5 (15·5 to 21·5)
Luxembourg	87·5 (85·6 to 89·0)	92·6 (89·6 to 95·0)	89·7 (88·4 to 90·7)	77·5 (75·4 to 79·6)	19·6 (17·4 to 21·7)	13·9 (10·3 to 17·5)	20·5 (18·8 to 22·2)	21·3 (18·6 to 24·1)
Malta	85·1 (83·2 to 86·7)	90·2 (87·0 to 93·1)	86·6 (85·1 to 87·8)	75·2 (73·0 to 77·2)	17·3 (14·9 to 19·6)	10·0 (6·3 to 13·5)	18·1 (16·0 to 20·1)	23·4 (20·4 to 26·5)
Monaco	87·4 (84·4 to 90·2)	92·2 (90·5 to 93·8)	87·7 (84·1 to 90·6)	78·1 (74·5 to 82·4)	10·3 (6·5 to 13·8)	9·2 (6·8 to 11·9)	8·8 (4·4 to 13·3)	10·6 (4·7 to 16·4)
Netherlands	91·1 (88·7 to 92·6)	93·9 (92·5 to 95·1)	92·7 (89·8 to 94·4)	80·5 (76·9 to 83·5)	16·0 (14·0 to 17·6)	12·0 (10·1 to 14·0)	16·3 (13·7 to 18·4)	17·0 (13·5 to 20·2)
Norway	90·4 (88·3 to 92·2)	95·9 (94·6 to 97·0)	90·7 (88·3 to 92·8)	79·4 (76·5 to 82·0)	17·8 (15·7 to 19·9)	13·1 (11·3 to 14·7)	19·1 (16·4 to 21·6)	20·5 (17·6 to 23·5)
Portugal	83·9 (81·5 to 86·0)	91·0 (89·2 to 92·5)	84·0 (80·8 to 86·4)	74·9 (71·0 to 77·9)	23·0 (20·7 to 24·9)	22·6 (20·6 to 24·9)	22·3 (19·3 to 24·9)	22·1 (18·4 to 25·4)
San Marino	88·6 (82·8 to 93·1)	91·8 (89·3 to 93·7)	91·4 (84·1 to 96·2)	80·8 (71·9 to 88·4)	9·0 (2·7 to 14·7)	9·4 (6·4 to 12·3)	7·2 (–0·4 to 13·5)	8·7 (–0·6 to 17·5)
Spain	89·7 (87·2 to 91·4)	92·9 (91·5 to 94·3)	91·2 (88·2 to 93·1)	80·0 (76·8 to 82·5)	18·6 (16·2 to 20·3)	14·0 (12·2 to 16·1)	20·6 (17·7 to 22·7)	19·9 (16·8 to 22·8)
Sweden	90·4 (88·4 to 92·1)	95·7 (94·4 to 96·8)	90·5 (88·1 to 92·4)	78·5 (75·7 to 81·5)	14·0 (11·8 to 16·2)	9·5 (7·9 to 11·4)	15·2 (12·8 to 17·6)	16·1 (13·0 to 19·4)
Switzerland	92·6 (90·1 to 94·3)	95·0 (93·5 to 96·2)	95·0 (92·2 to 96·8)	83·0 (79·5 to 86·3)	14·2 (11·9 to 16·1)	8·8 (7·3 to 10·6)	15·4 (12·4 to 17·8)	15·5 (11·9 to 19·1)
UK	83·3 (80·9 to 85·6)	91·0 (89·7 to 92·3)	82·4 (79·5 to 85·2)	71·9 (68·7 to 75·2)	13·3 (10·8 to 15·8)	10·8 (9·6 to 12·1)	13·1 (10·3 to 15·8)	15·6 (12·3 to 19·5)
Latin America and Caribbean	**50·7 (48·5 to 52·8)**	**58·7 (55·8 to 61·5)**	**51·4 (49·3 to 53·4)**	**48·7 (46·8 to 50·7)**	**18·3 (15·9 to 20·6)**	**23·8 (20·2 to 27·3)**	**14·8 (12·6 to 16·8)**	**13·7 (11·8 to 15·6)**
Andean Latin America	53·1 (49·4 to 56·7)	60·5 (56·5 to 64·1)	54·3 (50·5 to 57·8)	52·0 (48·2 to 55·8)	23·2 (19·0 to 27·3)	31·3 (27·2 to 35·3)	19·1 (14·8 to 23·2)	17·7 (13·1 to 21·9)
Bolivia	40·5 (36·5 to 44·8)	50·1 (45·7 to 55·0)	43·1 (38·0 to 48·2)	36·1 (31·1 to 41·3)	20·3 (15·6 to 25·1)	29·2 (24·0 to 34·9)	16·9 (10·7 to 22·8)	12·8 (7·1 to 18·5)

(Table continues on next page)

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Ecuador	52·9 (49·5 to 56·2)	61·4 (57·6 to 65·1)	52·3 (48·1 to 56·5)	51·4 (46·2 to 56·3)	19·9 (15·6 to 23·9)	24·6 (20·1 to 28·9)	14·7 (9·9 to 19·4)	14·9 (9·1 to 20·3)
Peru	60·0 (54·7 to 64·8)	66·4 (61·6 to 70·7)	60·7 (55·1 to 65·6)	61·1 (55·5 to 66·5)	26·0 (20·3 to 31·2)	33·7 (28·5 to 39·0)	22·6 (16·1 to 28·2)	22·1 (15·0 to 28·7)
Caribbean	42·2 (39·4 to 45·0)	42·6 (38·3 to 47·4)	44·7 (41·5 to 47·5)	47·0 (43·8 to 49·8)	11·4 (7·9 to 14·6)	13·8 (9·6 to 18·0)	9·1 (5·4 to 12·4)	10·7 (7·3 to 13·9)
Antigua and Barbuda	58·2 (55·0 to 61·2)	71·2 (67·0 to 74·9)	55·1 (52·0 to 57·9)	51·9 (48·4 to 55·0)	11·1 (7·7 to 14·5)	4·4 (–0·4 to 9·0)	12·9 (9·5 to 16·3)	13·1 (9·3 to 16·8)
The Bahamas	52·6 (49·3 to 55·6)	70·3 (67·2 to 73·2)	47·1 (43·7 to 50·3)	48·5 (44·7 to 52·2)	10·3 (6·2 to 14·3)	12·1 (8·0 to 16·0)	8·7 (4·0 to 13·1)	11·4 (6·8 to 16·2)
Barbados	59·0 (55·1 to 62·6)	73·8 (70·1 to 77·2)	55·7 (51·5 to 59·4)	52·7 (48·5 to 56·6)	10·9 (6·8 to 14·9)	11·9 (7·5 to 16·0)	11·5 (7·2 to 15·6)	11·7 (7·4 to 16·2)
Belize	49·5 (47·0 to 51·9)	63·2 (60·3 to 66·0)	46·1 (43·0 to 48·7)	49·1 (45·7 to 52·2)	10·6 (7·5 to 13·8)	20·0 (15·6 to 24·3)	4·1 (0·6 to 7·4)	9·0 (4·8 to 12·6)
Bermuda	77·4 (73·9 to 80·2)	87·2 (84·2 to 89·5)	76·3 (72·7 to 79·3)	72·2 (68·5 to 75·3)	21·3 (17·6 to 24·6)	16·1 (12·4 to 19·8)	22·2 (18·3 to 25·8)	23·9 (19·7 to 27·7)
Cuba	66·2 (63·3 to 69·2)	82·1 (79·9 to 84·1)	62·8 (59·6 to 66·3)	58·1 (53·7 to 62·0)	12·4 (8·7 to 16·1)	14·1 (11·5 to 16·6)	12·4 (7·9 to 16·7)	8·8 (3·6 to 13·4)
Dominica	45·2 (41·1 to 49·3)	55·5 (50·7 to 59·9)	46·1 (41·8 to 50·1)	42·3 (37·6 to 46·3)	7·5 (2·9 to 12·1)	1·8 (–3·3 to 6·6)	9·3 (4·4 to 13·9)	9·3 (4·5 to 13·8)
Dominican Republic	45·4 (40·6 to 49·7)	53·5 (48·6 to 58·0)	45·8 (40·9 to 50·7)	47·0 (42·0 to 51·9)	12·0 (7·1 to 16·7)	21·5 (16·2 to 26·4)	7·1 (1·9 to 12·6)	4·3 (–1·3 to 10·2)
Grenada	50·4 (48·3 to 52·4)	67·7 (64·4 to 71·1)	46·9 (44·5 to 49·3)	40·7 (37·5 to 43·5)	13·8 (11·1 to 16·4)	15·1 (10·9 to 19·7)	14·2 (11·2 to 17·3)	12·5 (9·2 to 15·6)
Guyana	37·2 (32·7 to 41·6)	54·1 (49·9 to 58·1)	32·6 (27·6 to 37·2)	33·2 (28·3 to 37·8)	9·4 (4·5 to 14·4)	12·4 (7·1 to 17·6)	7·8 (2·6 to 13·0)	9·3 (4·1 to 14·7)
Haiti	24·5 (20·9 to 29·0)	29·5 (24·3 to 35·9)	25·9 (21·0 to 31·2)	25·2 (19·6 to 31·1)	12·4 (8·2 to 16·4)	14·4 (9·8 to 19·2)	11·4 (5·4 to 16·8)	8·7 (3·4 to 13·9)
Jamaica	55·5 (51·4 to 59·5)	68·1 (64·3 to 71·9)	52·6 (48·2 to 56·8)	52·3 (48·0 to 56·4)	7·8 (3·4 to 12·2)	14·9 (10·4 to 19·1)	4·4 (–0·3 to 8·7)	7·2 (2·7 to 12·0)
Puerto Rico	70·6 (66·4 to 74·4)	80·2 (77·1 to 83·1)	68·9 (64·1 to 73·1)	68·0 (63·1 to 72·3)	16·1 (11·7 to 20·3)	12·0 (8·6 to 15·1)	17·8 (12·9 to 22·3)	19·4 (14·4 to 24·5)
Saint Kitts and Nevis	51·3 (47·3 to 56·1)	67·3 (63·2 to 72·6)	50·1 (44·5 to 57·0)	42·4 (38·3 to 45·7)	19·2 (14·7 to 24·3)	18·5 (13·4 to 24·2)	21·1 (15·3 to 28·5)	16·0 (11·8 to 19·4)
Saint Lucia	52·8 (49·1 to 56·1)	65·8 (61·7 to 69·6)	50·2 (46·7 to 53·2)	50·1 (46·2 to 53·7)	15·0 (11·1 to 18·5)	13·2 (8·2 to 17·8)	14·7 (11·1 to 18·2)	15·4 (11·7 to 19·5)
Saint Vincent and the Grenadines	47·9 (44·8 to 50·9)	63·0 (59·1 to 66·7)	44·0 (40·9 to 46·9)	44·9 (41·8 to 48·1)	9·2 (5·6 to 12·5)	13·8 (9·1 to 18·6)	5·9 (2·5 to 9·2)	8·5 (4·8 to 12·0)
Suriname	43·0 (39·4 to 46·3)	55·9 (51·7 to 59·8)	42·1 (38·5 to 45·3)	42·1 (38·4 to 45·8)	9·6 (5·8 to 13·4)	14·7 (8·3 to 20·1)	7·8 (3·7 to 11·4)	8·3 (4·4 to 12·3)
Trinidad and Tobago	52·9 (48·1 to 57·8)	65·5 (61·5 to 69·5)	48·8 (43·3 to 54·0)	48·5 (43·1 to 53·7)	13·0 (7·9 to 17·9)	11·2 (6·6 to 15·7)	13·1 (7·6 to 18·6)	16·1 (10·5 to 21·7)
Virgin Islands	56·7 (53·3 to 59·9)	77·8 (74·8 to 80·5)	52·8 (48·7 to 56·6)	50·8 (47·8 to 53·9)	9·9 (5·9 to 14·0)	15·9 (12·2 to 19·5)	8·5 (3·5 to 12·8)	7·6 (3·3 to 11·9)
Central Latin America	52·5 (49·4 to 55·8)	62·8 (59·6 to 65·7)	52·0 (48·7 to 55·8)	49·9 (46·5 to 53·4)	18·7 (15·4 to 22·2)	23·9 (20·3 to 27·5)	14·7 (11·4 to 18·4)	14·6 (11·3 to 18·1)
Colombia	61·1 (56·6 to 65·0)	67·6 (64·1 to 71·0)	62·3 (57·4 to 66·7)	59·4 (54·4 to 64·0)	22·2 (17·6 to 26·7)	20·8 (16·4 to 25·4)	20·4 (15·4 to 25·3)	20·9 (15·5 to 26·0)
Costa Rica	64·7 (60·4 to 68·6)	76·5 (73·2 to 79·5)	63·9 (59·4 to 68·1)	62·2 (57·3 to 66·5)	11·7 (7·2 to 16·2)	12·9 (9·6 to 16·3)	9·5 (4·7 to 14·0)	10·0 (4·9 to 14·7)
El Salvador	54·7 (50·3 to 59·0)	67·8 (63·8 to 71·9)	53·7 (48·8 to 58·3)	53·9 (49·5 to 58·5)	21·3 (16·4 to 26·1)	33·1 (27·8 to 38·3)	16·7 (11·7 to 21·8)	16·4 (10·8 to 22·0)
Guatemala	43·6 (39·1 to 47·9)	53·8 (49·8 to 57·7)	41·3 (36·4 to 45·9)	42·2 (37·1 to 47·1)	19·3 (13·8 to 24·2)	27·0 (22·6 to 31·3)	15·9 (9·8 to 21·3)	16·1 (10·3 to 21·4)

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	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Honduras	40·0 (36·2 to 43·5)	55·0 (50·9 to 59·1)	40·4 (35·0 to 44·9)	33·0 (29·9 to 36·3)	12·4 (8·1 to 16·2)	26·8 (21·8 to 32·1)	9·2 (3·6 to 14·2)	–0·2 (–4·2 to 3·6)
Mexico	52·5 (48·7 to 56·8)	63·8 (60·9 to 66·5)	51·3 (46·3 to 56·9)	49·0 (44·0 to 54·6)	17·3 (13·4 to 21·6)	21·7 (18·3 to 25·0)	13·3 (8·4 to 18·6)	13·2 (8·1 to 18·6)
Nicaragua	52·2 (49·2 to 55·3)	63·4 (60·4 to 66·2)	54·7 (51·1 to 58·4)	48·9 (44·9 to 52·9)	15·3 (11·6 to 18·9)	22·7 (18·9 to 26·7)	13·9 (9·3 to 18·2)	8·8 (3·9 to 13·5)
Panama	59·3 (54·9 to 63·6)	63·6 (59·7 to 67·5)	60·8 (55·4 to 65·5)	60·8 (55·7 to 65·3)	14·5 (9·5 to 19·5)	14·2 (9·6 to 18·6)	12·7 (7·2 to 18·0)	14·2 (8·6 to 19·3)
Venezuela	54·1 (49·6 to 58·6)	67·2 (63·9 to 70·6)	52·1 (46·9 to 56·8)	51·6 (46·1 to 56·6)	15·0 (9·8 to 20·0)	17·8 (13·9 to 21·7)	12·1 (6·9 to 17·4)	13·2 (7·7 to 18·6)
Tropical Latin America	52·8 (51·3 to 54·2)	62·4 (59·9 to 65·0)	53·3 (51·5 to 55·0)	48·6 (46·7 to 50·4)	17·4 (15·9 to 19·1)	20·8 (17·7 to 23·9)	15·1 (13·7 to 16·5)	12·0 (10·5 to 14·1)
Brazil	53·0 (51·5 to 54·3)	62·4 (59·9 to 65·0)	53·4 (51·6 to 55·1)	48·6 (46·7 to 50·5)	17·5 (15·9 to 19·1)	20·5 (17·6 to 23·7)	15·2 (13·8 to 16·7)	12·2 (10·6 to 14·2)
Paraguay	51·7 (47·0 to 56·0)	65·1 (60·8 to 68·9)	50·7 (45·8 to 55·1)	48·5 (43·3 to 53·6)	11·7 (6·8 to 16·7)	19·8 (15·6 to 24·5)	6·8 (1·5 to 11·8)	3·9 (–1·6 to 9·7)
North Africa and Middle East	**52·3 (49·9 to 54·4)**	**57·5 (54·7 to 60·3)**	**56·7 (53·9 to 59·0)**	**52·1 (50·0 to 54·1)**	**20·1 (17·4 to 22·6)**	**23·5 (19·0 to 27·6)**	**16·3 (13·4 to 18·8)**	**15·5 (12·5 to 18·4)**
Afghanistan	28·9 (25·4 to 32·3)	40·8 (35·9 to 45·2)	30·5 (25·3 to 35·9)	29·6 (25·5 to 35·2)	14·0 (10·5 to 17·6)	19·2 (12·2 to 26·3)	12·4 (6·8 to 17·4)	7·4 (2·8 to 12·8)
Algeria	58·7 (56·0 to 61·2)	64·9 (62·4 to 67·4)	61·5 (58·6 to 64·4)	59·6 (55·5 to 63·9)	19·6 (16·1 to 23·2)	23·3 (19·4 to 27·4)	17·5 (12·9 to 22·4)	15·1 (9·4 to 20·7)
Bahrain	67·6 (65·4 to 69·8)	73·7 (71·5 to 76·2)	71·7 (69·1 to 74·6)	63·0 (59·4 to 66·4)	23·2 (20·1 to 26·0)	18·4 (15·8 to 21·2)	22·1 (18·2 to 26·0)	21·0 (16·4 to 25·6)
Egypt	51·6 (47·1 to 55·5)	63·2 (59·4 to 66·7)	52·9 (47·9 to 57·3)	47·9 (43·0 to 52·9)	19·2 (14·7 to 23·4)	25·6 (20·9 to 29·7)	13·8 (9·0 to 18·1)	12·3 (7·0 to 17·8)
Iran	63·7 (62·1 to 65·3)	70·5 (68·2 to 72·6)	66·1 (64·5 to 67·6)	60·5 (58·4 to 62·5)	22·0 (19·4 to 24·6)	27·9 (23·7 to 32·3)	16·5 (13·8 to 19·2)	16·8 (12·9 to 20·1)
Iraq	57·4 (54·4 to 60·7)	66·5 (62·9 to 69·9)	58·4 (54·2 to 62·5)	57·4 (54·1 to 61·4)	19·5 (15·8 to 23·4)	24·0 (19·3 to 28·7)	15·0 (9·9 to 20·1)	14·2 (8·9 to 20·0)
Jordan	65·1 (62·7 to 67·4)	74·3 (71·4 to 77·1)	68·8 (66·6 to 70·9)	63·6 (60·4 to 66·8)	21·0 (17·2 to 24·7)	15·9 (12·3 to 19·3)	20·8 (16·7 to 24·8)	19·1 (13·9 to 24·3)
Kuwait	77·0 (75·0 to 78·9)	79·8 (77·6 to 81·8)	78·1 (76·2 to 79·8)	67·6 (64·7 to 70·3)	16·8 (14·1 to 19·4)	14·0 (11·3 to 16·7)	17·8 (15·0 to 20·5)	17·1 (13·3 to 21·1)
Lebanon	68·2 (65·4 to 71·2)	77·4 (73·7 to 80·8)	70·4 (66·9 to 74·1)	63·8 (59·2 to 68·3)	22·3 (18·9 to 25·7)	21·0 (16·1 to 25·5)	20·8 (16·6 to 25·2)	19·1 (14·3 to 24·1)
Libya	59·5 (56·1 to 62·8)	67·4 (63·9 to 70·7)	59·1 (55·3 to 62·6)	52·8 (48·6 to 58·0)	15·1 (10·6 to 19·4)	19·5 (14·8 to 24·0)	9·7 (4·8 to 14·4)	9·2 (3·6 to 14·8)
Morocco	48·5 (45·3 to 51·9)	60·2 (55·9 to 64·4)	52·8 (48·4 to 57·2)	46·5 (41·5 to 51·2)	16·1 (12·4 to 19·9)	21·8 (16·1 to 27·6)	12·2 (7·3 to 16·9)	9·7 (5·1 to 14·8)
Oman	67·5 (65·8 to 69·1)	76·8 (75·0 to 78·9)	70·9 (69·2 to 72·6)	59·0 (55·9 to 61·9)	23·5 (19·7 to 26·9)	19·5 (16·0 to 23·0)	21·1 (16·8 to 25·2)	20·3 (14·9 to 25·4)
Palestine	57·3 (55·2 to 59·7)	69·4 (66·7 to 72·2)	59·8 (57·3 to 62·4)	53·3 (49·1 to 57·2)	16·3 (12·3 to 20·4)	19·0 (13·8 to 24·0)	13·4 (8·5 to 18·3)	12·4 (6·3 to 18·4)
Qatar	73·7 (70·9 to 76·5)	78·9 (76·5 to 81·6)	79·1 (76·0 to 82·0)	68·4 (63·8 to 72·5)	24·2 (20·1 to 28·0)	21·5 (17·8 to 24·9)	23·5 (19·5 to 27·7)	18·9 (13·1 to 24·6)
Saudi Arabia	63·3 (60·8 to 65·7)	80·5 (78·2 to 83·1)	60·4 (57·2 to 63·7)	56·2 (53·1 to 59·4)	26·2 (21·2 to 30·7)	27·9 (23·6 to 31·7)	20·8 (13·2 to 28·0)	21·3 (15·1 to 27·6)
Sudan	43·9 (39·3 to 48·3)	48·4 (42·4 to 53·8)	48·9 (42·6 to 55·4)	44·9 (39·6 to 49·3)	19·1 (13·5 to 24·5)	23·1 (13·3 to 32·0)	15·8 (9·0 to 22·6)	10·9 (5·5 to 16·1)
Syria	60·2 (56·2 to 64·0)	63·7 (60·5 to 66·7)	63·8 (59·5 to 67·9)	59·9 (54·6 to 65·0)	21·6 (16·3 to 26·4)	22·3 (17·5 to 27·1)	17·7 (11·4 to 23·6)	14·5 (6·9 to 20·9)
Tunisia	63·9 (59·4 to 67·8)	71·5 (68·7 to 74·2)	67·1 (62·1 to 71·5)	60·7 (54·9 to 65·8)	18·0 (13·0 to 22·6)	24·7 (20·6 to 28·7)	13·9 (8·4 to 18·8)	12·2 (5·6 to 18·5)

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(Continued from previous page)								
Türkiye	64·8 (62·1 to 67·7)	68·9 (66·2 to 71·4)	71·3 (67·8 to 74·6)	61·5 (57·4 to 65·8)	27·9 (24·2 to 31·5)	29·1 (25·1 to 33·4)	25·9 (21·6 to 30·0)	20·2 (14·6 to 25·9)
United Arab Emirates	58·8 (55·5 to 62·2)	75·6 (72·4 to 78·6)	57·7 (53·5 to 61·8)	49·3 (44·5 to 53·8)	18·8 (15·1 to 22·9)	20·0 (16·8 to 23·0)	14·3 (9·1 to 19·7)	15·7 (10·3 to 21·4)
Yemen	39·3 (35·6 to 43·3)	48·5 (43·4 to 54·0)	43·1 (38·3 to 48·1)	38·4 (34·0 to 43·0)	13·4 (8·4 to 18·3)	18·5 (11·0 to 25·7)	9·2 (2·2 to 15·8)	7·5 (1·6 to 12·7)
South Asia	**37·9 (34·5 to 41·1)**	**51·4 (48·3 to 54·3)**	**39·2 (34·9 to 43·1)**	**36·0 (31·6 to 40·4)**	**18·2 (14·4 to 22·0)**	**21·9 (15·8 to 26·3)**	**15·3 (10·6 to 20·0)**	**13·5 (9·0 to 18·7)**
Bangladesh	44·1 (40·7 to 48·0)	49·4 (45·4 to 53·6)	45·9 (41·8 to 50·8)	46·4 (41·4 to 52·9)	23·6 (18·8 to 28·3)	25·2 (18·0 to 31·0)	20·6 (15·0 to 25·7)	16·5 (10·3 to 22·6)
Bhutan	42·1 (37·2 to 46·9)	54·8 (49·8 to 60·0)	44·8 (40·0 to 49·6)	37·5 (32·4 to 42·8)	20·1 (11·1 to 26·6)	19·6 (1·4 to 30·4)	18·5 (10·4 to 25·3)	11·9 (6·0 to 17·6)
India	39·2 (35·2 to 43·1)	54·7 (51·3 to 58·0)	40·2 (35·1 to 45·2)	36·4 (31·1 to 41·8)	19·1 (14·5 to 23·8)	23·4 (17·1 to 28·2)	16·1 (10·1 to 21·9)	14·2 (8·9 to 20·1)
Nepal	38·8 (36·2 to 41·9)	53·8 (50·0 to 57·3)	41·2 (37·6 to 45·6)	35·4 (31·6 to 39·9)	19·1 (15·2 to 23·3)	23·5 (16·4 to 28·5)	17·7 (12·0 to 24·0)	10·5 (5·3 to 16·5)
Pakistan	32·4 (27·2 to 37·7)	45·5 (41·4 to 50·2)	33·9 (27·3 to 40·9)	31·2 (24·9 to 37·1)	10·1 (5·0 to 15·5)	9·3 (3·2 to 15·4)	7·3 (0·6 to 14·5)	5·7 (–0·2 to 11·4)
Southeast Asia, east Asia, and Oceania	**57·7 (54·9 to 60·4)**	**64·5 (62·2 to 66·8)**	**61·0 (57·6 to 64·3)**	**56·5 (52·7 to 60·2)**	**26·4 (22·6 to 30·0)**	**30·0 (27·0 to 32·8)**	**24·5 (19·6 to 29·3)**	**22·2 (16·7 to 26·9)**
East Asia	69·8 (66·0 to 73·6)	77·9 (76·0 to 79·9)	71·6 (66·7 to 76·1)	64·9 (59·7 to 70·0)	34·5 (29·2 to 39·8)	39·2 (35·7 to 42·4)	30·7 (23·7 to 37·8)	27·2 (20·3 to 33·7)
China	70·2 (66·2 to 74·1)	78·0 (76·1 to 80·0)	72·2 (67·2 to 77·2)	65·3 (59·9 to 70·7)	35·2 (29·7 to 40·6)	39·6 (36·0 to 42·8)	31·5 (24·2 to 39·0)	27·6 (20·5 to 34·3)
North Korea	50·1 (47·1 to 53·4)	67·4 (63·7 to 71·2)	48·4 (44·3 to 52·3)	45·4 (41·6 to 49·1)	13·7 (10·0 to 17·7)	25·9 (20·4 to 31·7)	7·1 (0·7 to 13·6)	5·9 (1·4 to 10·7)
Taiwan	78·0 (74·8 to 81·0)	89·3 (87·5 to 91·2)	76·3 (72·8 to 79·6)	69·6 (64·9 to 73·7)	19·1 (15·1 to 22·5)	12·8 (10·5 to 14·9)	20·3 (16·1 to 24·0)	26·3 (20·8 to 31·2)
Oceania	32·0 (28·2 to 35·8)	40·3 (35·7 to 44·7)	33·4 (29·3 to 37·6)	37·4 (33·3 to 41·4)	4·7 (1·0 to 8·5)	5·2 (0·1 to 10·0)	3·3 (–0·8 to 7·1)	3·4 (–0·5 to 7·0)
American Samoa	45·5 (41·7 to 48·9)	63·0 (58·7 to 66·7)	43·9 (39·9 to 47·5)	44·6 (41·7 to 47·4)	5·3 (1·3 to 9·4)	7·3 (2·5 to 11·9)	3·2 (–0·9 to 7·5)	5·4 (2·0 to 9·0)
Cook Islands	63·0 (59·4 to 66·4)	80·1 (76·9 to 84·4)	58·5 (54·2 to 62·5)	59·1 (55·7 to 62·0)	16·8 (12·4 to 20·9)	21·5 (17·0 to 26·5)	12·8 (7·6 to 17·9)	15·1 (10·9 to 19·2)
Federated States of Micronesia	35·6 (31·8 to 41·6)	57·4 (53·5 to 69·7)	31·3 (27·0 to 38·2)	33·2 (28·1 to 38·7)	10·5 (5·9 to 17·5)	15·0 (9·5 to 28·4)	7·3 (1·5 to 15·7)	7·5 (1·2 to 14·2)
Fiji	38·7 (34·2 to 42·7)	48·9 (44·5 to 53·0)	38·5 (34·0 to 42·8)	41·9 (37·3 to 46·1)	5·4 (0·1 to 10·3)	1·8 (–3·4 to 6·6)	5·4 (–0·1 to 10·8)	4·5 (–1·4 to 10·0)
Guam	56·5 (53·3 to 59·3)	67·0 (64·5 to 69·5)	55·8 (52·4 to 58·6)	59·1 (55·6 to 62·2)	4·9 (1·6 to 8·3)	3·5 (0·8 to 6·2)	2·6 (–0·8 to 6·1)	12·0 (7·5 to 16·2)
Kiribati	24·2 (21·2 to 27·2)	42·0 (37·9 to 46·2)	24·1 (20·8 to 28·0)	25·3 (20·8 to 29·7)	8·2 (4·2 to 12·0)	11·8 (5·8 to 17·4)	7·0 (2·7 to 11·3)	5·8 (1·1 to 10·7)
Marshall Islands	32·1 (28·2 to 35·9)	51·8 (48·1 to 55·6)	28·9 (24·9 to 33·1)	32·0 (26·6 to 36·8)	6·3 (2·4 to 10·6)	4·9 (0·4 to 9·2)	4·4 (0·1 to 9·2)	7·3 (2·5 to 12·2)
Nauru	35·5 (32·8 to 38·4)	50·5 (47·0 to 53·8)	32·7 (30·0 to 35·9)	35·4 (31·4 to 39·6)	6·4 (3·4 to 9·2)	6·6 (2·4 to 10·5)	4·9 (1·3 to 8·1)	5·7 (1·5 to 9·8)
Niue	47·8 (43·9 to 51·7)	58·1 (54·3 to 61·5)	47·5 (42·2 to 52·3)	46·6 (43·4 to 50·2)	10·0 (5·4 to 14·7)	6·2 (1·9 to 10·8)	10·8 (4·5 to 16·7)	9·6 (5·7 to 13·9)
Northern Mariana Islands	55·7 (53·1 to 58·2)	69·1 (65·7 to 72·2)	54·9 (52·1 to 57·8)	54·5 (52·1 to 57·1)	6·1 (2·9 to 9·4)	4·3 (1·2 to 6·9)	6·5 (1·9 to 10·9)	7·3 (3·9 to 10·9)
Palau	48·5 (45·3 to 51·9)	62·3 (59·2 to 65·5)	47·2 (43·8 to 51·1)	48·0 (44·1 to 51·6)	8·7 (4·0 to 13·5)	10·1 (5·1 to 14·8)	6·9 (1·6 to 12·7)	8·7 (3·8 to 13·7)

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(Continued from previous page)								
Papua New Guinea	31·4 (27·1 to 35·5)	38·5 (33·6 to 43·2)	33·3 (28·5 to 38·2)	37·4 (31·9 to 42·7)	4·6 (0·4 to 9·2)	6·4 (0·9 to 11·5)	3·0 (–1·9 to 8·1)	1·5 (–3·5 to 6·2)
Samoa	43·7 (39·2 to 48·1)	63·1 (58·7 to 67·4)	41·4 (36·6 to 46·6)	41·0 (37·4 to 44·5)	9·8 (4·1 to 15·8)	16·2 (9·8 to 22·9)	6·8 (–0·0 to 14·2)	7·5 (2·6 to 12·2)
Solomon Islands	30·3 (27·6 to 33·8)	52·7 (49·2 to 56·4)	26·1 (23·4 to 30·9)	30·4 (26·0 to 35·8)	7·7 (4·2 to 11·6)	9·4 (4·5 to 14·2)	5·7 (1·6 to 9·9)	5·7 (0·9 to 11·1)
Tokelau	45·9 (41·7 to 50·0)	65·0 (61·8 to 68·4)	43·4 (38·1 to 48·9)	43·6 (39·1 to 48·0)	14·1 (9·1 to 19·4)	15·5 (11·1 to 19·6)	12·2 (5·8 to 18·6)	12·4 (7·0 to 17·5)
Tonga	45·8 (42·0 to 49·8)	61·1 (56·7 to 64·9)	44·8 (40·3 to 49·2)	45·3 (41·5 to 48·8)	6·8 (2·4 to 11·2)	8·5 (3·6 to 13·3)	4·9 (–0·4 to 9·9)	5·2 (0·5 to 9·6)
Tuvalu	37·7 (33·3 to 41·5)	57·8 (53·9 to 61·6)	34·4 (30·2 to 38·5)	36·3 (30·8 to 41·2)	14·7 (9·4 to 19·4)	23·6 (16·2 to 29·8)	10·6 (4·5 to 16·1)	10·6 (4·7 to 15·6)
Vanuatu	31·1 (27·1 to 35·1)	49·0 (45·4 to 52·8)	28·3 (23·8 to 33·5)	31·5 (26·6 to 37·0)	3·8 (–1·2 to 8·7)	4·2 (–0·8 to 9·3)	2·1 (–5·1 to 8·8)	3·0 (–2·7 to 8·5)
Southeast Asia	43·2 (40·8 to 45·5)	55·0 (52·4 to 57·6)	45·0 (41·8 to 48·0)	42·6 (40·2 to 45·3)	16·0 (13·2 to 19·0)	22·4 (17·1 to 26·4)	13·4 (10·1 to 16·9)	10·9 (7·8 to 14·2)
Cambodia	38·0 (35·4 to 41·0)	49·9 (44·6 to 54·1)	38·2 (34·5 to 42·3)	34·7 (31·4 to 38·8)	19·6 (15·4 to 23·7)	27·2 (19·0 to 33·0)	18·4 (12·9 to 23·9)	10·8 (6·1 to 16·0)
Indonesia	40·9 (36·5 to 45·3)	55·6 (52·3 to 58·8)	42·8 (36·4 to 48·2)	39·5 (35·0 to 45·8)	15·0 (10·4 to 20·1)	24·0 (18·3 to 28·6)	12·0 (5·6 to 18·0)	7·3 (2·1 to 14·1)
Laos	33·0 (28·8 to 36·9)	45·2 (40·2 to 50·1)	34·8 (30·2 to 39·4)	33·0 (28·9 to 37·1)	20·1 (14·4 to 25·3)	27·0 (17·5 to 34·5)	20·0 (13·2 to 26·2)	11·2 (5·5 to 16·8)
Malaysia	55·4 (51·4 to 59·1)	74·6 (72·0 to 77·2)	55·2 (50·7 to 59·4)	45·9 (41·3 to 50·1)	17·3 (13·2 to 21·4)	17·8 (14·7 to 21·2)	15·5 (10·8 to 20·0)	15·2 (10·4 to 20·3)
Maldives	60·7 (58·6 to 62·8)	67·6 (64·3 to 71·3)	65·8 (63·8 to 68·0)	59·2 (55·7 to 62·7)	29·9 (26·2 to 33·4)	28·2 (23·3 to 34·1)	30·0 (25·9 to 34·1)	26·3 (21·1 to 32·1)
Mauritius	56·7 (53·5 to 59·6)	70·5 (67·8 to 73·0)	53·8 (50·3 to 57·0)	56·9 (53·6 to 60·1)	11·2 (7·9 to 14·6)	8·3 (5·2 to 11·2)	10·7 (7·3 to 14·1)	15·7 (12·0 to 19·4)
Myanmar	37·5 (33·6 to 41·2)	47·0 (41·5 to 52·3)	39·3 (35·3 to 43·3)	40·2 (36·7 to 43·3)	18·5 (12·4 to 25·1)	24·3 (16·0 to 32·9)	16·5 (8·8 to 24·1)	11·0 (4·3 to 17·0)
Philippines	40·8 (35·9 to 46·0)	52·3 (49·4 to 55·0)	41·6 (35·3 to 48·5)	41·5 (35·4 to 48·3)	6·9 (1·5 to 12·6)	13·4 (8·8 to 17·5)	3·9 (–3·0 to 11·1)	1·9 (–5·1 to 9·3)
Seychelles	52·8 (50·6 to 55·0)	70·3 (67·4 to 73·2)	52·2 (50·0 to 54·4)	47·7 (45·0 to 50·5)	13·4 (10·6 to 16·2)	7·4 (4·2 to 10·8)	14·0 (11·2 to 16·8)	13·0 (9·5 to 16·7)
Sri Lanka	60·5 (55·9 to 64·4)	73·9 (70·4 to 77·0)	60·2 (55·3 to 64·2)	57·1 (51·7 to 62·0)	21·8 (16·9 to 26·4)	20·6 (16·5 to 24·8)	19·8 (14·7 to 24·3)	21·1 (14·6 to 27·2)
Thailand	62·5 (58·2 to 66·5)	73·9 (71·5 to 76·6)	63·4 (58·1 to 68·2)	61·1 (56·0 to 66·0)	19·5 (14·8 to 23·9)	20·5 (17·1 to 24·2)	17·7 (11·9 to 23·2)	16·5 (10·2 to 22·3)
Timor-Leste	35·7 (31·7 to 42·7)	51·4 (47·0 to 59·7)	36·7 (31·5 to 45·5)	32·2 (27·6 to 37·4)	15·4 (9·7 to 23·4)	25·0 (13·9 to 37·5)	12·6 (5·2 to 21·6)	4·8 (0·0 to 10·8)
Viet Nam	55·6 (52·9 to 58·4)	68·7 (65·6 to 71·8)	56·4 (53·0 to 60·0)	51·1 (47·4 to 55·2)	20·1 (16·3 to 24·2)	19·0 (14·6 to 23·5)	17·4 (11·8 to 23·3)	17·1 (11·3 to 22·5)
Sub-Saharan Africa	**29·0 (26·7 to 31·7)**	**33·7 (29·4 to 38·4)**	**34·3 (31·2 to 37·5)**	**29·8 (27·4 to 32·4)**	**11·4 (8·1 to 14·6)**	**14·4 (8·2 to 20·0)**	**11·1 (7·6 to 14·4)**	**6·9 (4·4 to 9·6)**
Central sub-Saharan Africa	28·3 (25·2 to 31·6)	40·5 (33·8 to 46·7)	31·1 (27·2 to 35·0)	27·0 (22·9 to 30·8)	12·6 (8·4 to 16·9)	20·2 (12·4 to 26·1)	10·5 (5·6 to 15·7)	6·6 (2·1 to 10·8)
Angola	29·3 (25·2 to 33·5)	40·6 (33·8 to 47·1)	32·7 (27·4 to 38·0)	28·2 (23·8 to 32·3)	15·4 (9·3 to 21·3)	21·7 (13·1 to 29·9)	14·8 (6·4 to 22·5)	8·6 (1·9 to 14·7)
Central African Republic	15·2 (10·8 to 19·9)	26·2 (21·1 to 31·4)	17·3 (11·8 to 23·4)	17·2 (12·3 to 22·4)	4·0 (–0·7 to 8·7)	7·2 (0·8 to 13·6)	3·1 (–2·7 to 8·8)	2·4 (–2·2 to 7·1)
Congo (Brazzaville)	34·0 (30·0 to 38·1)	51·5 (44·5 to 57·2)	35·9 (31·2 to 40·7)	30·6 (26·3 to 34·7)	14·5 (9·3 to 19·6)	18·8 (12·3 to 25·4)	14·6 (7·8 to 21·2)	11·2 (5·3 to 16·4)
Democratic Republic of the Congo	29·0 (25·8 to 32·4)	42·3 (34·3 to 49·7)	31·2 (27·0 to 35·6)	27·3 (22·7 to 32·1)	11·4 (6·9 to 16·0)	20·7 (11·3 to 28·4)	7·5 (1·8 to 13·9)	5·8 (0·8 to 11·1)

(Table continues on next page)

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Equatorial Guinea	42·4 (35·4 to 48·8)	59·1 (50·2 to 67·7)	44·9 (37·1 to 51·6)	38·1 (31·9 to 44·4)	30·1 (21·7 to 37·6)	38·1 (28·3 to 47·9)	30·4 (21·1 to 39·2)	21·2 (13·7 to 28·6)
Gabon	39·6 (35·7 to 44·1)	57·2 (49·5 to 64·4)	41·5 (36·3 to 46·8)	35·3 (30·8 to 40·6)	15·1 (9·9 to 20·3)	22·4 (14·6 to 29·5)	13·5 (7·2 to 20·4)	10·7 (5·5 to 16·7)
Eastern sub-Saharan Africa	28·6 (26·4 to 30·9)	38·7 (34·4 to 43·6)	32·3 (29·4 to 35·7)	27·4 (24·8 to 30·4)	13·6 (10·2 to 16·8)	19·1 (11·8 to 25·2)	12·6 (9·2 to 16·0)	7·4 (4·6 to 9·9)
Burundi	25·8 (22·1 to 30·0)	38·1 (31·7 to 45·5)	27·5 (23·1 to 32·4)	24·4 (20·1 to 28·8)	10·8 (5·4 to 15·9)	17·2 (7·8 to 25·4)	7·8 (1·4 to 14·0)	5·7 (−0·4 to 11·2)
Comoros	31·8 (28·8 to 36·2)	45·0 (39·2 to 50·9)	35·6 (30·9 to 41·8)	28·7 (24·9 to 32·4)	10·3 (−3·8 to 16·8)	14·4 (−1·4 to 22·8)	8·3 (−8·8 to 16·9)	6·5 (−3·3 to 12·4)
Djibouti	32·6 (27·5 to 37·8)	40·9 (34·7 to 47·2)	36·3 (29·7 to 43·3)	30·6 (25·6 to 35·5)	9·0 (2·7 to 14·8)	10·9 (2·7 to 19·0)	7·0 (−0·8 to 14·5)	5·4 (−0·4 to 10·8)
Eritrea	25·6 (21·1 to 30·3)	40·1 (32·7 to 46·9)	25·9 (20·8 to 31·7)	23·1 (18·8 to 28·1)	12·2 (6·3 to 17·7)	18·5 (8·9 to 27·5)	10·3 (3·8 to 16·7)	4·9 (−1·7 to 10·8)
Ethiopia	31·2 (27·4 to 35·6)	42·1 (36·9 to 47·1)	35·9 (29·8 to 42·7)	29·2 (24·9 to 34·1)	21·5 (16·5 to 26·9)	26·9 (18·4 to 34·8)	23·4 (16·6 to 30·5)	14·2 (9·0 to 19·9)
Kenya	33·4 (29·2 to 38·1)	51·4 (46·8 to 55·8)	34·9 (29·1 to 40·9)	27·8 (23·2 to 33·0)	5·3 (0·5 to 10·3)	13·8 (6·8 to 19·6)	1·9 (−4·3 to 8·9)	1·3 (−3·1 to 5·8)
Madagascar	29·0 (25·1 to 33·3)	42·8 (38·3 to 47·8)	32·0 (26·6 to 37·4)	28·6 (23·3 to 34·1)	9·3 (4·2 to 14·2)	21·7 (13·0 to 28·2)	6·1 (0·6 to 11·7)	1·9 (−3·6 to 7·9)
Malawi	29·9 (26·9 to 33·1)	41·9 (36·0 to 47·7)	32·3 (28·2 to 37·0)	28·1 (24·7 to 31·9)	11·3 (6·2 to 15·8)	21·8 (11·9 to 29·7)	6·8 (0·9 to 12·6)	5·3 (0·7 to 9·7)
Mozambique	25·1 (21·6 to 29·2)	40·7 (34·3 to 47·0)	26·5 (21·9 to 31·8)	22·6 (18·9 to 26·7)	8·8 (3·8 to 13·6)	21·0 (11·2 to 29·6)	2·8 (−3·1 to 8·9)	1·5 (−3·3 to 6·4)
Rwanda	31·8 (28·9 to 34·9)	41·9 (35·4 to 48·5)	35·6 (31·5 to 40·3)	30·7 (27·1 to 34·2)	17·3 (12·8 to 21·6)	21·4 (12·3 to 29·2)	17·0 (11·1 to 22·8)	13·3 (8·3 to 18·1)
Somalia	16·7 (11·8 to 21·6)	26·2 (21·1 to 31·9)	18·9 (13·0 to 25·1)	19·7 (13·7 to 25·4)	3·9 (−1·1 to 8·6)	6·0 (−1·8 to 13·0)	2·1 (−4·7 to 8·2)	2·2 (−3·0 to 7·4)
South Sudan	29·1 (24·2 to 34·2)	33·6 (27·4 to 39·2)	35·6 (28·4 to 42·6)	30·2 (24·5 to 36·6)	9·5 (4·2 to 14·4)	11·5 (2·4 to 18·7)	6·8 (−1·5 to 14·1)	5·4 (−0·6 to 11·1)
Tanzania	32·5 (29·5 to 35·4)	37·3 (31·0 to 43·1)	37·6 (33·2 to 42·0)	32·9 (29·6 to 36·3)	8·9 (4·7 to 13·1)	12·9 (4·2 to 19·9)	7·0 (1·4 to 12·7)	6·2 (1·6 to 10·4)
Uganda	32·4 (29·1 to 35·8)	43·5 (37·0 to 50·3)	36·6 (32·7 to 40·8)	30·9 (27·5 to 34·7)	9·8 (5·0 to 14·4)	13·4 (4·8 to 21·2)	6·3 (−0·2 to 12·3)	6·5 (1·5 to 11·4)
Zambia	31·6 (28·2 to 35·5)	45·1 (38·8 to 51·4)	33·0 (28·3 to 38·3)	29·1 (25·1 to 34·1)	12·6 (7·3 to 17·7)	23·1 (12·1 to 31·1)	8·4 (2·5 to 14·9)	6·9 (1·8 to 12·4)
Southern sub-Saharan Africa	39·8 (37·9 to 41·9)	54·3 (50·8 to 57·8)	40·2 (37·6 to 42·7)	36·5 (34·8 to 38·2)	6·9 (4·0 to 9·7)	11·5 (6·9 to 16·0)	6·3 (2·8 to 9·6)	1·0 (−1·5 to 3·6)
Botswana	37·5 (33·4 to 42·0)	51·6 (46·7 to 56·5)	37·0 (31·6 to 43·2)	30·2 (26·2 to 34·8)	10·1 (5·5 to 15·5)	5·2 (−1·2 to 11·3)	10·4 (3·2 to 18·6)	7·2 (1·6 to 13·1)
Eswatini	32·5 (28·3 to 36·8)	47·7 (43·8 to 51·5)	32·0 (26·2 to 38·2)	28·6 (24·2 to 32·6)	5·1 (−0·8 to 10·8)	7·9 (1·6 to 13·5)	2·9 (−5·3 to 10·8)	2·2 (−4·1 to 7·4)
Lesotho	26·3 (22·2 to 30·5)	44·7 (40·5 to 48·4)	25·2 (20·1 to 30·8)	22·5 (17·4 to 27·0)	0·9 (−4·1 to 6·2)	4·8 (−0·7 to 10·3)	−2·2 (−8·6 to 4·7)	−2·0 (−7·0 to 3·4)
Namibia	39·9 (35·5 to 44·9)	57·5 (52·2 to 63·8)	39·1 (33·8 to 44·8)	32·0 (27·9 to 36·6)	14·3 (7·9 to 20·4)	15·6 (5·8 to 24·0)	13·4 (4·9 to 20·4)	8·5 (2·9 to 13·8)
South Africa	44·6 (42·2 to 46·9)	60·9 (57·4 to 64·2)	45·5 (42·0 to 48·6)	41·4 (39·1 to 43·6)	9·6 (6·7 to 12·7)	17·7 (13·0 to 22·1)	9·6 (5·8 to 13·4)	−0·8 (−3·8 to 2·2)
Zimbabwe	28·6 (25·7 to 31·7)	44·7 (39·9 to 51·1)	27·2 (23·4 to 31·5)	23·6 (20·2 to 27·2)	−2·6 (−6·7 to 2·0)	−1·1 (−8·8 to 7·5)	−4·6 (−9·9 to 1·1)	−2·1 (−6·3 to 2·5)
Western sub-Saharan Africa	29·7 (26·3 to 33·5)	30·5 (26·3 to 34·9)	37·0 (32·6 to 41·7)	32·2 (28·4 to 36·4)	10·3 (6·1 to 14·9)	11·2 (5·4 to 16·9)	10·5 (5·3 to 15·8)	7·2 (3·1 to 11·5)
Benin	31·4 (26·4 to 36·0)	34·5 (28·2 to 41·4)	36·5 (31·2 to 41·9)	32·0 (27·4 to 36·8)	11·3 (5·8 to 16·4)	14·5 (7·2 to 22·1)	9·0 (2·9 to 15·2)	7·3 (1·8 to 12·6)

(Table continues on next page)

	2019 HAQ Index (95% UI)				Absolute change 1990–2019 (95% UI)			
	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)	Overall (0–74 years)	Young (0–14 years)	Working (15–64 years)	Post-working (65–74 years)
(Continued from previous page)								
Burkina Faso	28·5 (24·9 to 32·4)	30·5 (25·0 to 36·1)	33·2 (29·0 to 38·0)	29·3 (25·0 to 33·9)	7·6 (3·4 to 11·8)	8·5 (2·0 to 15·0)	5·0 (–0·6 to 10·9)	3·5 (–1·7 to 8·7)
Cabo Verde	50·2 (47·7 to 52·9)	65·7 (61·7 to 70·2)	51·9 (49·0 to 54·6)	45·4 (42·3 to 48·6)	14·1 (10·6 to 17·4)	22·3 (16·3 to 27·9)	11·6 (8·0 to 15·3)	6·0 (1·8 to 9·9)
Cameroon	33·7 (29·2 to 38·2)	39·9 (34·3 to 46·5)	37·0 (31·7 to 42·7)	33·5 (28·6 to 38·5)	9·8 (4·5 to 15·3)	10·8 (3·6 to 18·9)	7·8 (1·6 to 14·7)	8·0 (2·3 to 13·8)
Chad	23·8 (20·3 to 27·2)	25·5 (20·5 to 32·2)	28·8 (23·9 to 34·1)	26·5 (22·1 to 30·9)	6·3 (2·1 to 10·3)	7·8 (1·9 to 13·4)	6·5 (0·6 to 12·8)	3·4 (–1·5 to 8·0)
Côte d'Ivoire	34·3 (30·4 to 39·4)	40·8 (34·9 to 48·2)	37·3 (32·4 to 42·8)	33·4 (29·0 to 38·5)	11·3 (6·2 to 16·7)	14·1 (6·6 to 21·9)	8·7 (2·7 to 15·3)	7·2 (2·2 to 12·8)
The Gambia	34·7 (31·4 to 39·0)	47·6 (41·5 to 53·7)	36·8 (32·3 to 41·9)	31·7 (27·3 to 37·2)	7·4 (1·8 to 13·2)	17·3 (8·9 to 26·1)	4·3 (–3·8 to 12·3)	2·9 (–4·2 to 10·0)
Ghana	36·1 (32·8 to 40·0)	47·4 (41·3 to 53·9)	38·6 (35·0 to 42·9)	35·2 (31·5 to 38·9)	10·0 (5·5 to 14·9)	13·1 (5·8 to 20·7)	7·8 (2·4 to 13·6)	7·6 (2·2 to 13·3)
Guinea	25·7 (21·4 to 30·5)	27·3 (21·2 to 34·2)	31·4 (26·5 to 36·2)	29·1 (24·8 to 33·9)	8·5 (3·6 to 13·8)	13·5 (6·2 to 20·8)	6·9 (1·0 to 13·0)	3·9 (–1·3 to 9·2)
Guinea-Bissau	24·3 (20·6 to 27·8)	36·6 (31·4 to 41·7)	25·7 (21·7 to 29·9)	23·2 (19·2 to 27·2)	10·6 (5·3 to 16·1)	19·2 (11·7 to 25·7)	8·3 (2·1 to 14·4)	6·6 (0·4 to 12·5)
Liberia	35·7 (31·6 to 40·3)	42·1 (35·0 to 49·3)	39·7 (34·5 to 45·1)	35·7 (30·5 to 41·0)	17·3 (12·3 to 22·3)	29·1 (18·8 to 37·7)	11·9 (5·3 to 18·3)	9·2 (2·9 to 15·1)
Mali	29·6 (24·8 to 35·3)	28·7 (21·9 to 36·6)	35·2 (30·3 to 41·0)	31·7 (26·6 to 37·0)	11·0 (5·5 to 16·1)	12·0 (4·9 to 19·2)	11·9 (5·5 to 17·7)	6·6 (1·0 to 12·0)
Mauritania	42·1 (37·2 to 48·2)	53·1 (45·9 to 60·5)	45·3 (39·6 to 51·7)	40·0 (34·9 to 46·3)	20·0 (14·1 to 26·6)	24·1 (15·6 to 32·6)	20·1 (13·4 to 26·9)	16·4 (10·7 to 22·9)
Niger	26·5 (21·3 to 32·0)	28·1 (20·9 to 37·4)	31·8 (26·5 to 37·9)	27·8 (22·7 to 33·7)	10·4 (4·8 to 15·6)	14·2 (6·7 to 21·4)	9·4 (3·2 to 15·1)	6·4 (1·0 to 11·5)
Nigeria	31·6 (26·0 to 38·0)	30·8 (25·8 to 36·4)	40·1 (32·1 to 49·0)	34·8 (28·0 to 42·4)	11·1 (4·3 to 18·2)	10·9 (3·9 to 17·8)	11·8 (1·7 to 21·5)	8·3 (0·4 to 16·3)
São Tomé and Príncipe	41·4 (37·5 to 45·2)	54·0 (48·3 to 58·6)	43·1 (38·2 to 47·3)	35·6 (31·5 to 39·4)	13·4 (8·1 to 18·0)	28·0 (21·1 to 34·4)	8·4 (1·6 to 13·9)	5·1 (–0·1 to 10·1)
Senegal	34·0 (30·4 to 38·4)	43·3 (38·0 to 49·5)	37·0 (32·5 to 42·3)	33·2 (29·0 to 38·3)	10·9 (5·2 to 16·7)	19·6 (11·8 to 27·7)	7·6 (1·4 to 14·3)	6·2 (–0·6 to 12·4)
Sierra Leone	30·9 (26·1 to 35·9)	30·5 (23·5 to 38·3)	34·8 (29·8 to 39·9)	32·2 (27·4 to 37·3)	9·9 (3·6 to 15·9)	15·0 (7·2 to 22·8)	3·9 (–2·5 to 11·1)	4·8 (–1·7 to 11·3)
Togo	33·5 (29·9 to 37·3)	45·5 (39·7 to 51·0)	35·3 (30·8 to 40·1)	31·2 (27·0 to 35·2)	8·8 (4·0 to 13·4)	17·2 (10·6 to 23·4)	5·6 (–0·4 to 11·9)	4·5 (–0·9 to 9·8)

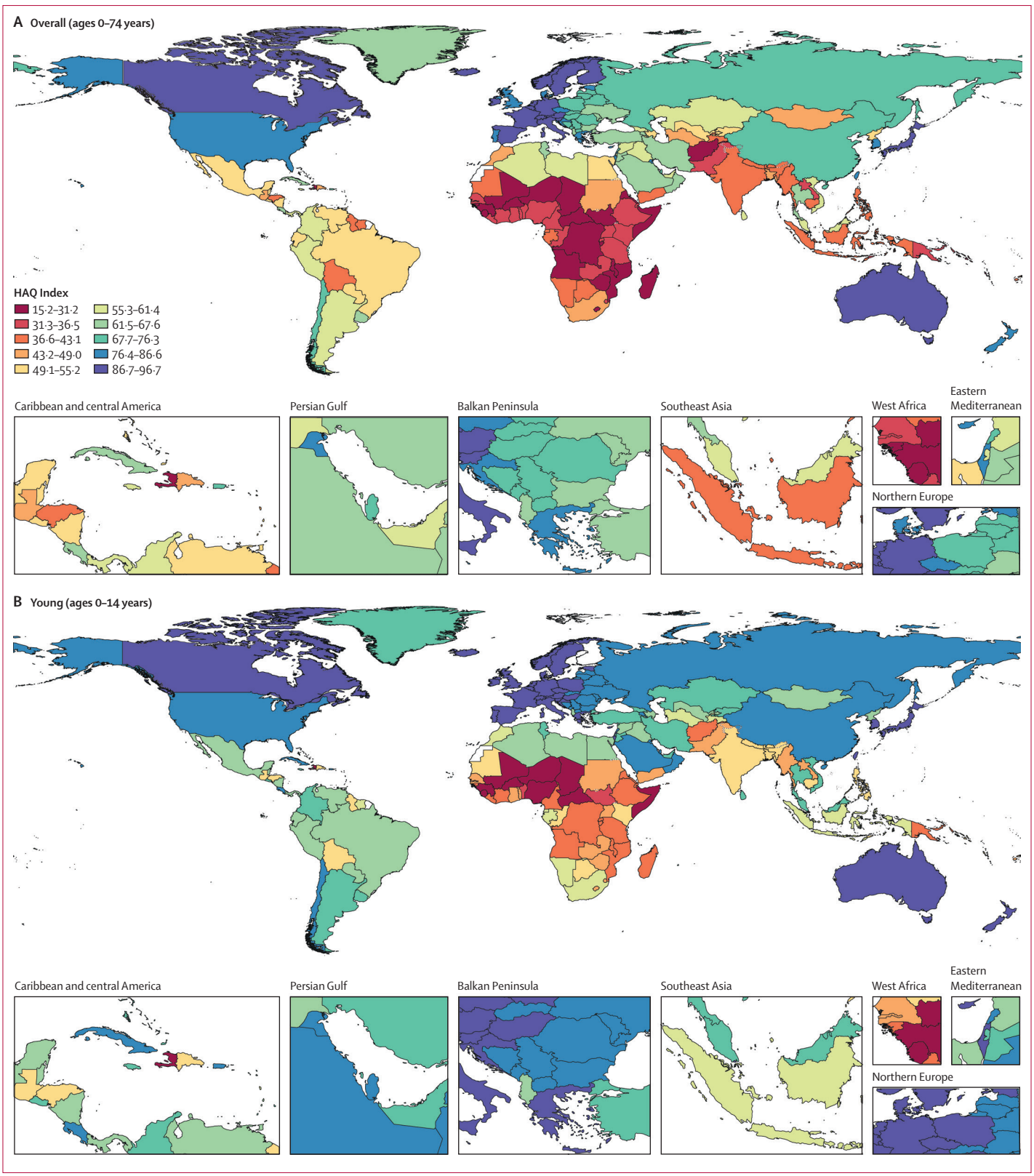
HAQ=Healthcare Access and Quality. SDI=Socio-demographic Index. UI=uncertainty interval.

Table: **HAQ Index estimates, by location, in 2019 and absolute change from 1990 to 2019, overall and by select age group**

assessed whether the HAQ Index increased more in countries starting with lower HAQ Index scores. We ran ordinary least squares regressions of the absolute change and the average annual percent change in the HAQ Index between 1990 and 2019 on the 1990 HAQ Index score. In a sensitivity analysis, we included the 1990–2019 change in SDI as a covariate in this regression. A regression of HAQ Index on SDI between 1990 and 2019, with standard errors clustered by location, was also conducted to assess the share of variation in HAQ Index explained by SDI, as represented by R^2. Second, we examined whether the coefficient of variation (the standard deviation divided by the mean) calculated for each year and age group declined over time, which would indicate that HAQ Index scores have become more similar since 1990. Third, we quantified the 1990–2019 change in the gap between the average HAQ Index in high-SDI-quintile countries versus the average HAQ Index in the four other SDI quintiles. Wherever results are aggregated, we weight values by each country's 2019 population.

Uncertainty analysis

We estimated uncertainty by taking 1000 draws from the posterior distribution for each cause of mortality amenable to health care and then used those draws to estimate the HAQ Index for each location and year. We ordered the draws and defined the 95% uncertainty interval (UI) by selecting the 25th draw for the lower bound of uncertainty and the 975th draw for the upper bound of uncertainty. The mean was taken across the draws to calculate the point estimate. Analyses were done with R version 3.1.2.



(Figure 1 continues on next page)

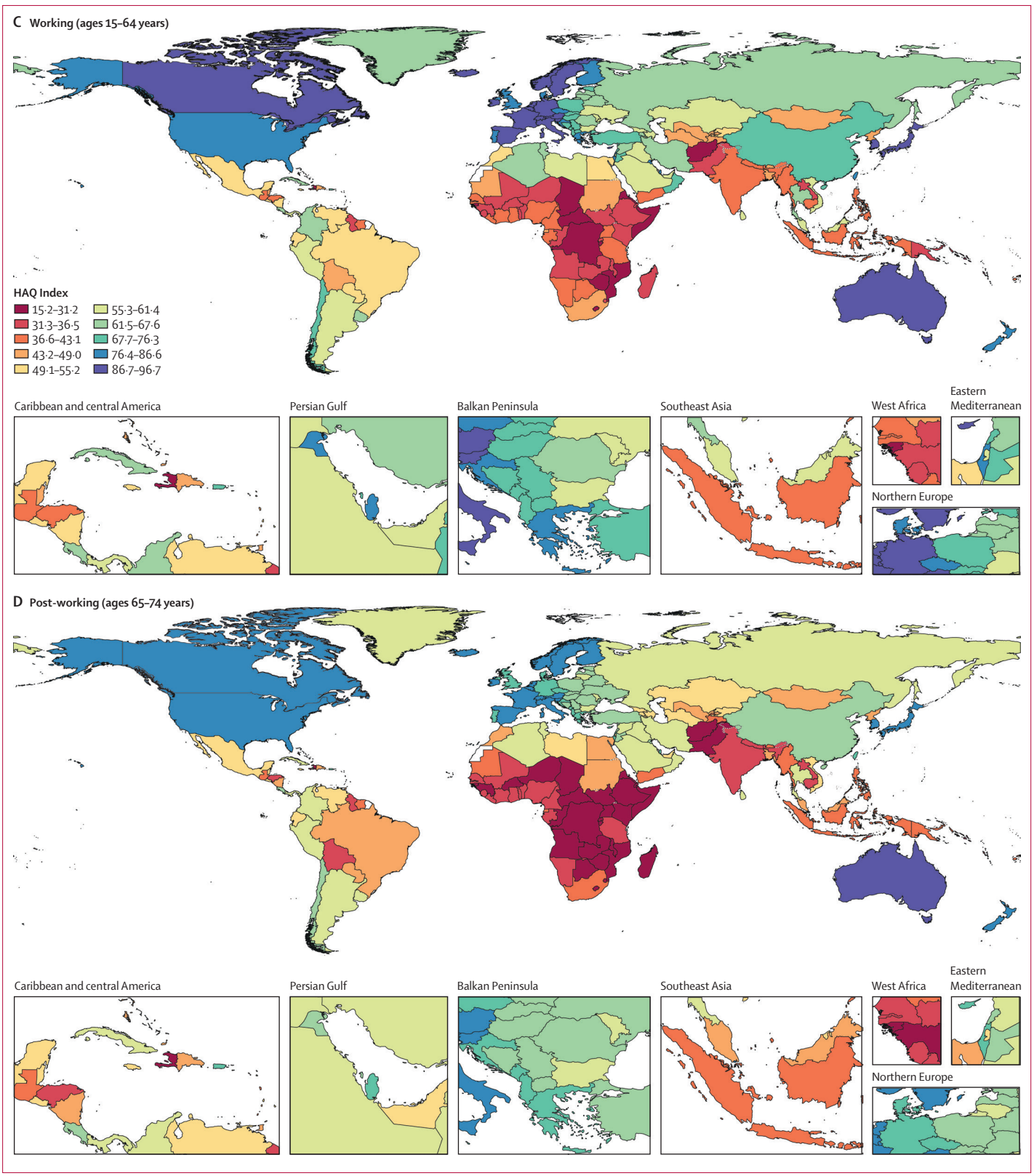


Figure 1: **HAQ Index, overall and by select age group, 2019, by country and territory**
HAQ=Healthcare Access and Quality.

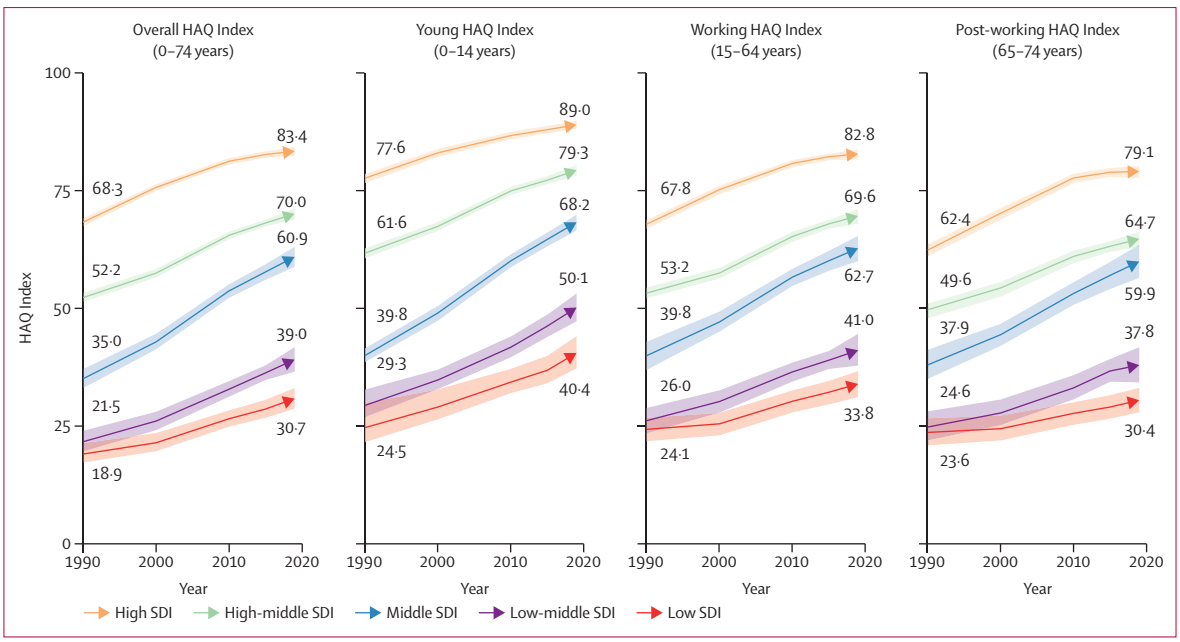


Figure 2: **Change over time in HAQ Index, 1990–2019, overall and by select age group**
HAQ=Healthcare Access and Quality. SDI=Socio-demographic Index.

Role of the funding source

The funder of the study had no role in the study design, data collection, data analysis, data interpretation, or writing of the report.

Results

In 2019, the global mean HAQ Index was 54·4 (95% UI 52·1–55·7), ranging from 15·2 to 93·1 across all countries and territories (table, figure 1A). The HAQ Index scores differed depending on levels of development and super-region. In high-SDI countries, the average HAQ Index score was 83·4 (82·4–84·3) in 2019, whereas low-SDI countries had an average HAQ Index score of 30·7 (28·6–33·0). Across GBD super-regions, the high-income region had the highest HAQ Index score (83·9, 82·6–85·0) and the sub-Saharan African region had the lowest average score (29·0, 26·7–31·7).

Globally, the overall HAQ Index increased by 19·6 points between 1990 and 2019, with improvements in HAQ Index scores in 185 of 204 countries and territories. Zimbabwe was the only country that did not improve (for others, the UIs overlapped). In 1990, Zimbabwe ranked 133rd globally, but in 2019 it dropped to 194th, a decline driven primarily by lack of progress across four diseases: inguinal, femoral, and abdominal hernia; idiopathic epilepsy; lower respiratory infections; and tuberculosis—but nearly all conditions failed to improve. Lesotho also had a substantial drop in rank order over the same period, falling from 151st to 185th globally. Although HAQ Index scores improved minimally for Central African Republic and Somalia, the two countries saw no change in global rank order over the time period. The gap between the lowest and highest HAQ Index scores in 2019 (77·9, 95% UI 15·2–93·1) was larger than the gap in 1990 (69·9, 9·7–79·6). High-SDI-quintile countries increased by 15·1 points, as compared with 25·9 points in middle-SDI and 11·8 points in low-SDI countries (figure 2). Across regions, increases were highest in east Asia (32·4 point increase), Andean Latin America (22·7 point increase), and high-income Asia Pacific (19·6 point increase). The smallest regional improvements over the time period occurred in Oceania (3·9 point increase), southern sub-Saharan Africa (6·3 point increase), and central Asia (8·2 point increase).

In 2019, the young age group had a global HAQ Index score of 64·5 (95% UI 62·9–66·0; figure 1B). This is an increase of 22·5 points (19·9–24·7) or 66·0% (52·8–77·0) relative to 1990 (table, figure 3). High-SDI countries had an average young HAQ Index of 89·0 (88·2–89·8) versus 40·4 (37·1–44·0) in low-SDI countries in 2019 (table, figure 2).

The global HAQ Index was 55·9 (95% UI 54·3–57·5) for the working age group in 2019 (figure 1C). The average improved by 17·2 points (15·2–19·1) or 50·8% (41·6–60·1) over 1990–2019. In 2019, the working HAQ Index was 82·8 (81·6–83·7) in high-SDI countries, 49·0 (46·0–52·0) points higher than the scores in low-SDI countries on average (33·8, 31·0–36·6; figure 2).

The post-working group had a global HAQ Index of 51·2 (95% UI 49·6–52·8; figure 1D). The post-working group improved by 15·1 points (13·2–17·0) or 45·6% (36·2–55·9) from its 1990 score. High-SDI countries' average HAQ Index (79·1, 77·7–80·2) was 48·7 (45·8–51·5) points higher than low-SDI

countries' average HAQ Index in 2019 (30·4, 27·8–33·0; figure 2).

In percentage terms, the young HAQ Index increased more than the working and post-working HAQ Indices from 1990 to 2019 (figure 3). Countries with lower scores in 1990 had higher percentage increases in all three age groups but relative convergence was similarly fastest among the young and slowest among the post-working followed by the working age groups (figure 4). HAQ Index scores in countries with the lowest scores for the young group in 1990 increased more than countries with higher scores in absolute terms as well (figure 4): we found that for each additional 10 points in the 1990 young HAQ Index, scores increased 1·3 points more slowly (p<0·0001). In contrast, countries with higher scores increased faster for the working and post-working age groups: for each additional 10 points in the 1990 score, the 2019 HAQ Index was 1·1 points higher for the working group (p<0·0001) and 2·1 points higher for the post-working group (p<0·0001). Over 1990–2019, the coefficient of variation declined most in the young group (0·128, 95% UI 0·082 to 0·167) as compared with the working (0·039, 0·008 to 0·066) and post-working (0·004, –0·024 to 0·029) groups.

HAQ Index scores and trends over time varied substantially by SDI quintile. The 1990–2019 percentage increases in the young HAQ Index score were highest in the three lowest SDI quintiles (figure 3). Increases were lowest among the young age group in high-SDI countries (15·6%, 95% UI 14·7–16·6). Regressing HAQ Index on SDI over 1990–2019, 89% of variation in the young HAQ Index, as represented by the R^2, was explained by just SDI, as compared with 75% of variation in the working group HAQ Index and 77% in the post-working group HAQ Index (see appendix p 40 for full regression results). The gap between the high-SDI-quintile HAQ Index scores versus other locations decreased substantially in the young age group (figure 5), with the biggest absolute declines in the middle-SDI group (17·0, 14·8–19·0), followed by the low-middle (9·5, 3·9–13·5) and high-middle (6·3, 4·9–7·8) SDI groups. For the working and post-working age groups, only middle-SDI countries reduced this gap. In contrast, low-SDI countries increased the gap with high-SDI countries by 5·3 (2·4–8·2) points in the working group and 9·9 (7·3–12·4) in the post-working group.

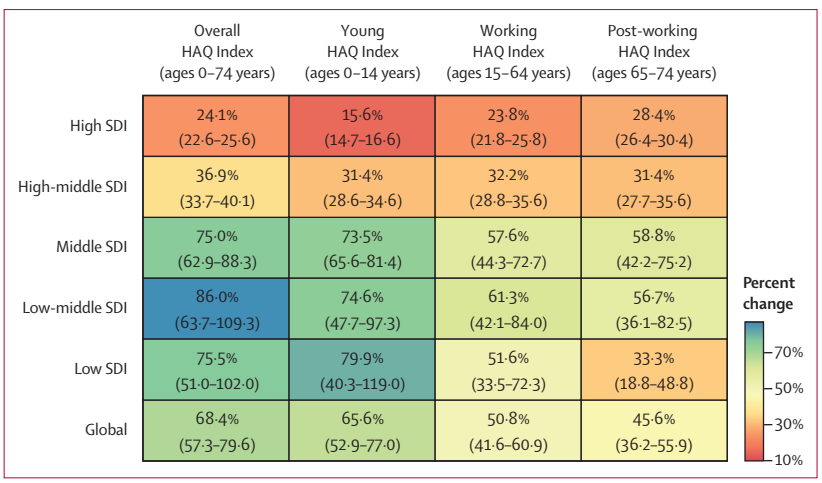


Figure 3: **Percentage change in HAQ Index by select age group and SDI quintile between 1990 and 2019**
Values in parentheses are 95% uncertainty intervals. HAQ=Healthcare Access and Quality. SDI=Socio-demographic Index.

Discussion

Our analysis showed improvements in the overall and select age group HAQ Indices in almost every country and territory between 1990 and 2019. However, disparities in HAQ Index scores across locations persisted into 2019. Between 1990 and 2019, the gap with the high-SDI quintile in the young group declined or was steady for all SDI levels. In the two other age groups, only the middle-SDI-quintile countries closed the average gap with high-SDI-quintile countries, and the gap for the low-SDI-quintile countries grew. While we find evidence of convergence in the young HAQ Index, social and economic development remains a crucial predictor of levels and trends in health-care access and quality.

Countries with higher social and economic development had better performance in the HAQ Index—nearly 50 points separates the lowest and highest SDI quintiles for the overall and age-group scores. Social and economic development supports countries in raising more funds for health, pooling resources for health insurance, improving the health-care workforce, and other factors that enhance the ability of health systems to improve health-care access and quality.[46,56,57] Greater resources also enable purchasing of more expensive technology, equipment, and pharmaceuticals to prevent and treat disease.

This study emphasised major improvements in the HAQ Index for the young age group between 1990 and 2019. Countries with lower scores in the past have made strides in closing disparities with highest performers on the HAQ Index. This observation aligns with the convergence theory advanced by the *Lancet* Commission on Investing in Health—that the burden of infectious diseases and maternal, neonatal, and child health in high-mortality LMICs could converge to the rates seen in best-performing middle-income countries.[58] More substantial improvements in the young HAQ Index relative to the other age groups might be related to the billions of dollars in development assistance disbursed for these health areas over the past 30 years,[59] and the creation and diffusion of relatively effective and cheap technologies, such as vaccines and oral rehydration salts that reduced mortality due to vaccine-preventable diseases and diarrhoea.[60–64]

In contrast, our analysis shows less convergence in the post-working and working groups. This observation can be explained in part by comparatively lower funding for

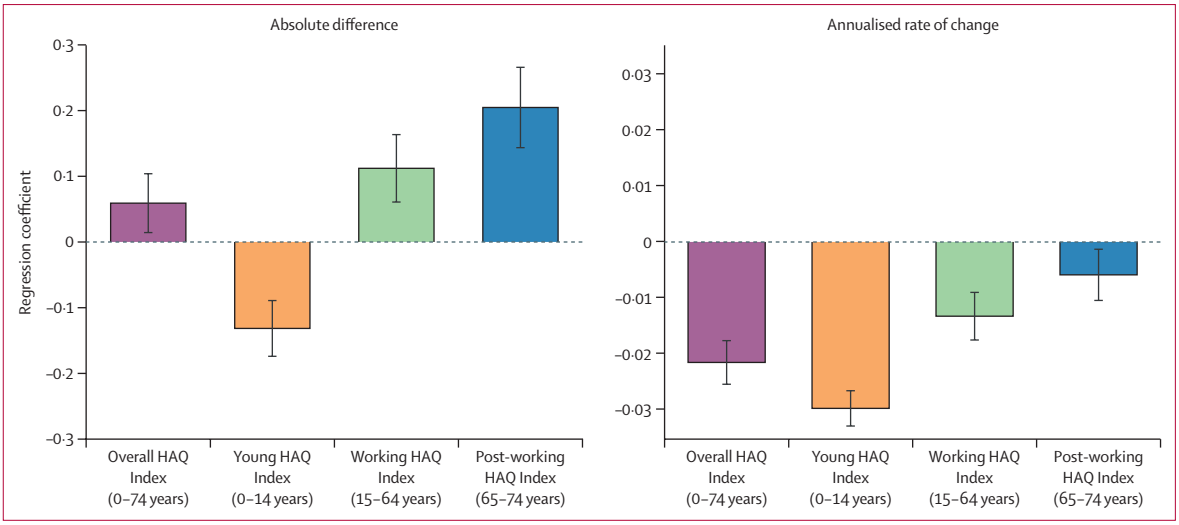


Figure 4: **Testing for convergence: absolute and relative change in HAQ Index, 1990–2019, versus 1990 HAQ Index, overall and by select age group**
Bars represent the coefficients estimated from a linear regression of the absolute or relative (annual average percent) change in the HAQ Index between 1990 and 2019 on the 1990 HAQ Index value, conducted for each group separately. Black error bars represent the coefficients' 95% uncertainty intervals. HAQ=Healthcare Access and Quality.

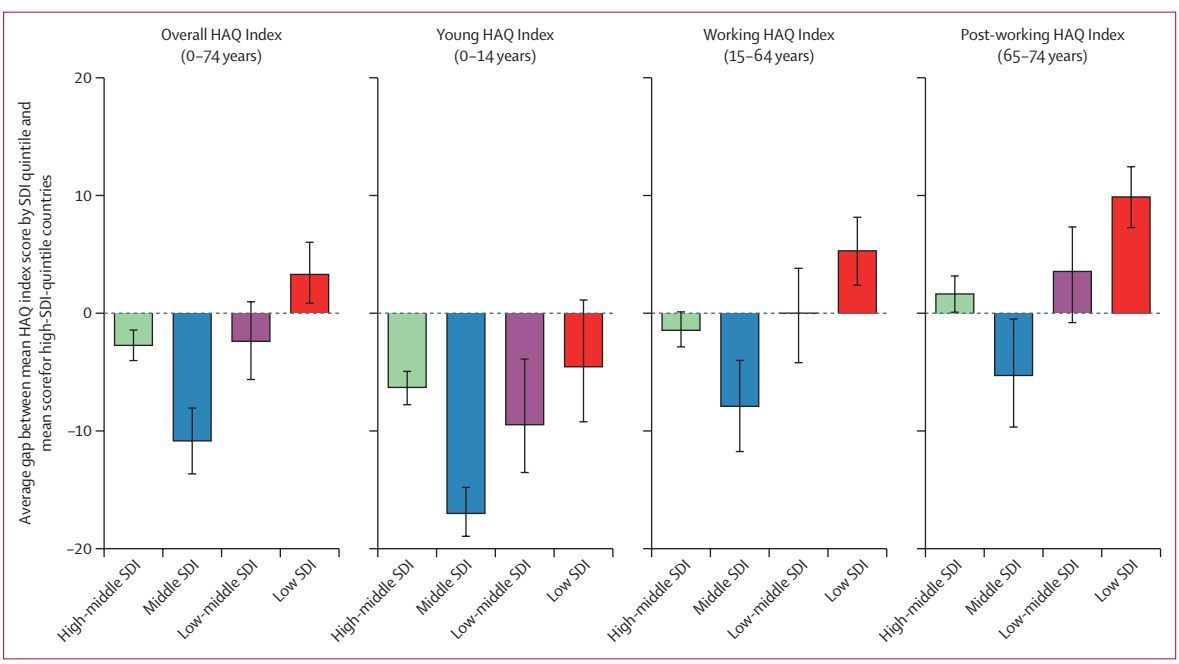


Figure 5: **Change in gap in HAQ Index score between high-SDI quintile and other quintiles, overall and by select age group, 1990–2019**
Black error bars represent 95% uncertainty intervals. HAQ=Healthcare Access and Quality. SDI=Socio-demographic Index.

NCD care; in addition, conditional on the same set of diseases and conditions, averting mortality for older people requires more complex responses, a higher level of organisational capacity, higher costs, and different technology, treatment, and diagnostics.[65–69] Differences could also be explained by how health systems evolve to meet their populations' needs. High-SDI countries had a higher median age than the low-SDI countries with the lowest average HAQ Index scores in 2019.[1] More broadly, some of these shortcomings might be due to the lack of robust primary health care. Health systems should address health needs across the life course, along the continuum of care, and focus on health more holistically rather than homing in on a single disease.[70]

Given transitions in burden of disease and ageing, lags in improving health-care access and quality for the working and post-working age groups could have broader social and economic consequences. In the absence of formal health system capacity for elder care, women and children often bear the brunt of care-taking duties, with

implications for gender equity and educational attainment.[71,72] If lack of access to high-quality health care depresses labour force participation or productivity among the working age group, countries going through the demographic transition might be unable to benefit from the demographic dividend,[73] with implications for tax revenue, intra-family income transfers, and the broader ability of countries to confront increasing dependency ratios (ratio of the working age adult population to populations typically not working: aged 0–14 years and ≥65 years) forecasted for decades to come.[1]

Future analyses of the HAQ Index should focus on the direct and indirect effects the COVID-19 pandemic. The COVID-19 pandemic threatens to reverse the gains in health-care access and quality observed over the past 30 years. Although most COVID-19 deaths occur among older people, the pandemic might well threaten health-care access and quality gains achieved at all ages, through lack of health system capacity, drains on infrastructure, staff, and other health system resources, or alternatively through the channel of reduced social and economic development.[74] Particularly as COVID-19 vaccination rates rise in high-income countries while lower-income countries continue to face supply and access shortages, the ongoing pandemic could further increase gaps in health-care access and quality between low-SDI and high-SDI countries. Even so, the COVID-19 pandemic has also brought about innovation in the provision of health care, catalysing an expansion in the use of telemedicine that could have lasting benefits, including for the equity of health-care access and quality.[75]

This study has a number of important strengths. This analysis provides a comparable measure of health-care access and quality for 204 countries and territories over 1990–2019. It examines differences in health-care access and quality by age, shedding light on one area of health system performance across the life course.

Some of the limitations of the HAQ Index have been highlighted in the previous analyses.[12,13,21] First, we were not able to further disaggregate characteristics of health-care access or quality, including separating quality from other features of health care,[76,77] determining the ability of any particular client or group to seek and obtain care, or estimating the role of acceptability or cultural barriers.[78] Second, the Nolte and McKee list has not been updated, resulting in the omission of some causes of death that could be amenable to timely and appropriate health care. Future analyses should consider expanding this list of causes. Third, our analysis is subject to limitations in the GBD cause of death estimation, such as death misclassifications and lack of complete vital registration records differing by country. Fourth, using MIRs for cancers and other causes instead of RSDRs provided an improved indicator of country-level differences in access to effective care, but broader MIR use is limited by the sparsity of data and methodological demands. Fifth, we only consider amenable mortality up to the age of 74 years because we chose to be consistent with past versions of the HAQ Index and with Nolte and McKee's views that mortality might not be amenable with quality health-care access after age 75 years. Future analyses should interrogate this view and consider whether extending the age range beyond age 74 years would be more consistent with life expectancy. Sixth, grouping populations by the OECD definition of working-age connects our analysis with a more high-income country perspective; alternative age groupings could be useful and pertinent depending on the country context. Seventh, we recognise that the direct and indirect determinants of health are broad and varied. Multiple factors outside of the immediate health sector, including policies, social determinants, and other drivers, could affect access to quality health care—eg, access contingent upon employment or age. Eighth, we acknowledge that uncertainty can differ depending on the age group, since different data quality, population size, and cause variation exist across age. This could affect both the bounds set when scaling MIRs and RSDRs to 0–100 as well as in the analysis of coefficient of variation over time; however, we believe the effect to be minimal.

Understanding the causal pathways and drivers is a vital research endeavour; however, to provide a more focused analysis, we limited this index to evaluation of health services only. Finally, in future research, we propose that two areas of work should be prioritised: the incorporation of how access and quality of care expressly impact non-fatal outcomes, and further segmentation of the HAQ Index by age—including for the important group of adolescents.

Health-care access and quality has improved in almost all countries and territories since 1990, progress which is essential for achieving effective universal health coverage and health for all.[13] However, major gaps in the HAQ Index persist across countries. Convergence in performance for the young population, although far from fully realised, suggests that the major investments, technology innovations, and policy priority focused on these groups are yielding successes. The slower convergence between best-performing health systems and other health systems in the HAQ Index for working and post-working populations is concerning as the demographic transition looms large. Further prioritisation of investments and cost-effective health care is essential for addressing health-care needs, maintaining a healthy workforce, and ensuring fiscal sustainability as populations age worldwide.

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Please see the appendix (pp 3–7) for more detailed information about individual author contributions to the research, divided into the following categories: managing the overall research enterprise; writing the first draft of the manuscript; primary responsibility for applying analytical methods to produce estimates; primary responsibility for seeking, cataloguing, extracting, or cleaning data; designing or coding figures and tables; providing data or critical feedback on data sources; developing methods or computational machinery; providing critical feedback on methods or results; drafting the manuscript or revising it critically for important intellectual content; and managing the estimation or publications process.

Declaration of interests

S Afzal reports participation on a Data Safety Monitoring Board or Advisory Board with the Corona Expert Advisory Group and Infectious Diseases Expert Advisory Group and is a Fellow of Faculty of Public Health, UK and the Dean of Public Health and Preventive Medicine and a chairperson for Community Medicine at King Edward Medical University, Pakistan. R Ancuceanu reports payment or honoraria for lectures, presentations, speaker's bureaus, manuscript writing or educational events from Abbvie, B. Braun, Sandoz, and Laropharm. S Bhaskar is the Board Director of the Rotary Club of Sydney, chair of Rotary District 9675, Diversity, Equity, and Inclusion, and is the chair/co-manager, Global Health and Migration Community Hub at the Global Health Hub Germany. B Bikbov reports support for the present manuscript from the European Union's Horizon 2020 Marie Sklodowska-Curie research and innovation programme grant number 703226, and reports grants or contracts from the Lombardy Region, paid to their institution, outside of the submitted work. J S Chandan reports grants or contracts from the National Institute for Health and Care Research as well as the Youth Endowment Fund, outside of the submitted work. N Fullman reports funding from WHO and Gates ventures, outside of the submitted work. C Herteliu reports grants or contracts from the Romanian Ministry of Research Innovation and Digitalization (ID-585-CTR-42-PFE-2021), outside the submitted work. C Herteliu and A Pana report grants or contracts from Romanian National Authority for Scientific Research and Innovation (PN-III-P4-ID-PCCF-2016-0084, PN-III-P2-2.1-SOL-2020-2-0351), outside the submitted work. S V Katikireddi reports support for the current manuscript from the Medical Research Council (MC_UU_00022/2)) and Scottish Government Chief Scientist Office (MC_UU_00022/2), payments made to their institution. S Mohammed reports support for the present manuscript from the Bill & Melinda Gates Foundation and reports a fellowship grant from Alexander von Humboldt Foundation, outside of the submitted work. L Monasta reports support for the present manuscript from the Italian Ministry of Health (Ricerca Corrente 34/2017), payments made to their institution. J Mosser reports support for the present manuscript from the Bill & Melinda Gates Foundation and report grants from Gavi, outside of the submitted work. S Sacco reports grants for contracts from Novartis, and Uriach as payments to their institution; personal consulting fees from Pfizer, AstraZeneca, Lilly, Novartis, Teva, Lundbeck, Abbott, and Novo Nordisk; payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or educational events from Allerga-Abbvie, Abbott, Norvartis, Lilly, Lundbeck, and Teva as personal payments; support for attending meetings or travel from Lilly; and is president elect of the European Stroke Organisation and second vice president of the European Headache Federation. S Sacco also reports receipt of equipment, materials, drugs, medical writing, gifts, or other services from Allergan-Abbvie, Novartis, and Novo Nordisk, all outside the submitted work. J A Singh reports consulting fees from Crealta/Horizon, Medisys, Fidia, PK Med, Two Labs, Adept Field Solutions, Clinical Care options, Clearview healthcare partners, Putnam associates, Focus forward, Navigant consulting, Spherix, MedIQ, Jupiter Life, UBM, Trio Health, Medscape, WebMD, and Practice Point communications, and the National Institutes of Health and the American College of Rheumatology; payment or honoraria for participating in the speakers bureau for Simply Speaking; support for attending meetings or travel from the steering committee of OMERACT, to attend their meeting every 2 years; participation on a data safety monitoring board or advisory board as an unpaid member of the FDA Arthritis Advisory Committee; leadership or fiduciary role in other board, society, committee or advocacy group, paid or unpaid, as a member of the steering committee of OMERACT, an international organisation that develops measures for clinical trials and receives arms length funding from 12 pharmaceutical companies, with the Veterans Affairs Rheumatology Field Advisory Committee as Chair, and with the UAB Cochrane Musculoskeletal Group Satellite Center on Network Meta-analysis as a director and editor; stock or stock options in TPT Global Tech, Vaxart pharmaceuticals, Atyu Biopharma, Adaptimmune Therapeutics, GeoVax Labs, Pieris Pharmaceuticals, Enzolytics, Series Therapeutics, Tonix Pharmaceuticals, and Charlotte's Web Holdings and previously owned stock options in Amarin, Viking, and Moderna pharmaceuticals; all outside the submitted work. D R Uezono is an employee of Roche Philippines, and their involvement in this article is done outside of their scope as an employee of Roche.

Data sharing

For detailed information regarding input data sources and to download the data used in these analyses, please visit the Global Health Data Exchange GBD 2019 website at https://ghdx.healthdata.org/gbd-2019.

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