

# Health and development: scenario in top and bottom 20\*2 countries

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Encouraged by the philosophy of Hans Rosling, the current study has tried to visualize development and health perspectives of the bottom 20 and top 20 countries ranked by health access quality (HAQ) index based on Socio-demographic Index (SDI), during last two and half decades (1990-2015). Also, the study has included BRICS countries (Brazil, Russia, India, China and South Africa) and the USA. The study has used secondary data from UNDP, WHO, World Bank and Global Burden of Disease and risk factor studies. Healthcare, health systems and development scenario of bottom 20 and top 20 countries ranked by HAQ index 2015 under SDI quartiles and BRICS countries and USA are presented in three different tables. It is evident that HAQ based on SDI quartiles reflects the better development and health outcomes. Instead of only 46 countries, more countries should be included and more health outcomes could be included in future studies.

Denna studie är inspirerad av Hans Roslings filosofi och försöker visualisera utvecklings- och hälsoperspektivet för de tjugo länder som för de senaste tjugofem åren (1990-2015) rankats högst respektive lägst utefter tillgången på hälsokvalitet (HAQ-index) baserat på ett sociodemografiskt index (SDI). Studien inkluderar BRICS-länderna (Brasilien, Ryssland, Indien, Kina och Sydafrika) och USA. Studien har använt sekundära data från UNDP (FNs utvecklingsprogram), WHO (Världshälsoorganisationen), Världsbanken, Global Burden of Disease Study och studier av riskfaktorer. I tre olika tabeller presenteras hälso- och sjukvård, hälso- och sjukvårdssystem och utvecklingsscenario i de tjugo högst respektive de tjugo lägst rankade länderna i 2015 års HAQ-index under SDI-kvartiler samt BRICS-länder och USA. Det är uppenbart att HAQ baserat på SDI-kvartiler uppvisar bättre utvecklings- och hälsoutfall. Istället för endast omfatta 46 länder borde framtida studier inkludera fler länder och fler hälsoutfall.

## Introduction

Health is wealth and health is our basic right. Access to health care and quality of health care are two important propositions for securing health rights. However, the countries with different political ideologies,

different systems and with their different stages of development achievement are suffering from different problems of health and of health care provisions.

My teacher, Hans Rosling taught us how to discuss health problems,

development issues and issues like poverty in a simple popular way. He taught us “*Extreme poverty produces diseases. Evil forces hide there.*”<sup>1</sup>. He was not optimist rather objective. He taught us in his classrooms, in his key-note speeches, in his TED talks through his whole life how to tell complex stories simply. He is the pioneer to introduce the art of simple presentation to attract the audience from policy makers to common people, from renowned scientists to philanthropists, from statisticians to painter. Hans actually taught us how to present data with original taught. As the teacher, he molded my thinking and especially my philosophy to do research and present them for the common people as much as possible. He taught me to look the health and development issues another way to get the true picture.

For the last couple of decades, the World Bank and the World Health Organization are presenting the health statistics for diseases and health along with economic and social data. United Nations Development Programme (UNDP) has been publishing the human development index (HDI) for member countries. HDI includes longevity, educational attainment (by literacy and enrolment), and income per capita<sup>2</sup>. We are also accustomed to using HDI assessing the state of development of a country. But, considering overall health, HDI may have failed to indicate how development influences health especially when an element of health (life expectancy) is incorporated within it.

Stalwarts like Hans Rosling and

Christopher Murray have reiterated that development could be a driver not a determinant of health. Considering their resources, there are countries who have improved health more rapidly and there are countries who have worsened health such as the USA. The country's development could not be explained by HDI, embracing income, education, or life expectancy and at the same time could not be measure health improvement when a part of health parameter (life expectancy at birth) is already included in the HDI. Therefore to compare health metrics across countries we need a new index where health is not included. Hans Rosling was against the categorization like developed or developing countries.

The global burden of disease, injuries and risk factor (GBD) researchers have developed Socio-demographic Index (SDI) intending to avoid the country's labeling as developed or developing. SDI is a new measurement for a country's socio-demographic development and includes average income per person, educational attainment and total fertility rate (TFR). SDI score ranges from zero to one. Lowest SDI score zero represents the lowest income per capita, lowest educational attainment, and highest TFR. On the other hand highest SDI score one represents the highest income per capita, highest educational attainment, and lowest TFR. SDI is based on observations across all GBD countries from 1980 to 2015. More details of SDI are available in the GBD series in The Lancet. Recently GBD researchers have measured Health-

care Access and Quality (HAQ) Index<sup>3</sup>. HAQ is based on mortality from causes amenable to individual health-care access and quality on the basis of SDI in 195 countries in 1990 and 2015. Encouraged by Hans's philosophy the current study has tried to visualize development and health perspective of the bottom 20 and top 20 countries ranked by the health access quality index based on SDI, during last two and half decades (1990-2015). Also the study has included BRICS countries (Brazil, Russia, India, China and South Africa) and the USA.

### Methods

The HAQ study has presented the country performance of the HAQ Index by the SDI quartiles<sup>3</sup>. The current study has selected top 20 HAQ index (2015) countries from highest SDI scores and bottom 20 HAQ index (2015) countries from lowest SDI scores, USA and BRICS countries from the HAQ study<sup>3</sup>. Details of HAQ index and countries are available in the HAQ article<sup>3</sup>. Human development index (HDI) data were extracted from UNDP website<sup>2</sup>. Numbers of countries in the world have increased over the period of two and half decades (1990 -2014). During HDI 1990 UNDP has 130 countries while during HDI 2015 UNDP has 188 countries. So the HDI ranking for the countries may not be apparently reflected for comparison during this period. Therefore, for better understanding the HDI scores for the selected countries are also included.

Beside HAQ and HDI scores, to

get a better current scenario we have also included major health systems and health care financing variables during 2014. Health systems variables such as physicians, nurses-midwives per 10 000 population were extracted from the WHO world health statistics 2015<sup>4</sup>. Healthcare financing data during 2014 such as total health expenditure per gross domestic product (%), Domestic government health spending per total health spending (%), Prepaid private spending per total health spending (%), Out-of-pocket spending per total health spending (%), Development assistance for health per total health spending (%) and Annualized rate of change in total health spending per capita, 1995–2014 (%) were obtained from another GBD study (5)#. The study has used publicly available secondary country level data and hence need no ethical permission.

### Results

The study has presented in total 46 countries and their HAQ during 1990 and 2015, HDI scores and ranking during 1990 and 2015. Andorra has the highest HAQ index score 95 and Central African Republic has the lowest HAQ index score 29.

In the year 2015, Central African Republic has lowest HAQ score 29 among all the 195 countries and within the lowest SDI. It has higher HAQ score 31.1 during 1990. On the contrary Central African Republic has improved its HDI score from 0.25 to 0.352. Interestingly the country has demonstrated a negative score – 1.3%

for the annualized rate of change in total health spending per capita, 1995-2014. During 2015 Central African Republic has only 0.5 physician and 2.6 nurses and midwives per ten thousand populations (table 1). Niger has HAQ 2015 score 41 and HDI 2015 rank is 188. The HDI score of Niger has increased from 0.116 in 1990 to 0.353 in 2015. Niger has only 0.6% annualized rate of change in total health spending per capita, 1995-2014. During 2015 Niger has only 0.2 physician and 1.4 nurses and midwives per ten thousand populations (table 1).

Andorra has the highest HAQ score of 95. Though it has no HDI score in 1990, but 2010 HDI score is 0.819 and 2015 HDI score is 0.858 (table 2). Sweden has ranked at number four and Norway is at number five in HAQ 2015 score. However, Sweden has dropped a significant 12 places in HDI country ranking from two to 14 and Norway has gained five places from six to one during last 25 years (1990-2015). Sweden has 39 physicians and 110 nurses-midwives and Norway has 43 physicians and 173 nurses-midwives per 10 000 populations (table 2).

The BRICS countries have been collected from different SDI quartiles and inserted in table 3. With HAQ 2015 score 74, China has ranked at number seven in the second highest quartile while Bosnia and Herzegovina tops the quartile with HAQ 2015 score 78. In the same SDI quartile, Brazil HAQ 2015 score is 65 and South Africa has 52. India has HAQ 2015 score 45 while in the same SDI quartile Bangladesh score is 52 and Syria tops the quartile with HAQ

2015 score 75. Russia has HAQ 2015 score 65 in the highest SDI quartile. Performance of the HAQ Index 2015 was placed by the fourth SDI quartile – mainly included high income countries, to the first SDI quartile – mainly included low income countries. South Africa and India have low physicians density per 10 000 populations. China has a massive increase in HAQ score (24.7) while USA has only increased 7.6 in HAQ score during 1990 to 2015. Interestingly South Africa has only HAQ score increase of 6.4 during 1990 to 2015. At the same period of time South Africa has only increased in HDI score of 0.28.

### Discussions

For the first time health access quality (HAQ) index for 195 countries and territories has been estimated based on SDI. HAQ 2015 has used country level individual health care access and quality by measuring amenable mortality causes. Amenable mortality ought to be not fatal in the presence of effective health care facilities. Nolte and McKee have previously analyzed mortality amenable to health care only for OECD countries and confronted several methodological challenges<sup>6</sup>. However, for estimating HAQ, the GBD researchers have used highly standardized cause of death and risk factor estimates based on the GBD Study (3). GBD Healthcare Access and Quality Collaborators have improved and expanded the quantification of individual health care access and quality. They have tried to estimating HAQ to be as standardized

Table 1. Healthcare, health systems and development scenario of bottom 20 countries ranked by HAQ index 2015.

Bottom 20 countries	HAQ index 2015	HAQ index 1990	HAQ index 2015	HAQ 2015-1990	HDI score-1990	HDI-Rank-1990	HDI score 2015
Ethiopia	44.0	23.1	44.2	21.1	0.282	112	0.448
Madagascar	44.0	34.8	43.7	8.9	0.44	93	0.512
Mozambique	43.0	33.2	43.0	9.8	0.239	118	0.418
Benin	43.0	36.9	43.0	6.1	0.244	121	0.485
Uganda	43.0	34.0	42.9	8.9	0.354	103	0.493
Burkina Faso	43.0	32.9	42.9	10.0	0.15	129	0.402
Côte d'Ivoire	42.0	35.5	42.4	6.9	0.393	99	0.474
Sierra Leone	41.0	37.6	41.3	3.7	0.15	127	0.420
Niger	41.0	31.8	41.0	9.2	0.116	130	0.353
Burundi	40.0	25.5	40.4	16.9	0.235	120	0.404
DR Congo	40.0	35.6	40.4	4.8	0.395	98	0.435
South Sudan	39.0	33.4	38.8	5.4	0.255	116	0.418
Guinea	39.0	32.6	38.6	6.0	0.162	125	0.414
Haiti	38.0	24.9	38.5	13.6	0.356	102	0.493
Eritrea	38.0	28.9	38.1	9.2	NA	NA	0.420
Chad	38.0	35.6	37.7	2.1	0.157	126	0.396
Guinea-Bissau	36.0	32.7	36.3	3.6	0.410 †		0.420
Somalia	34.0	29.1	34.2	5.1	0.2	124	NA
Afghanistan	32.0	24.7	32.5	7.8	0.212	122	0.479
Central African Republic	29.0	31.1	38.6	7.5	0.258	115	0.352

as possible for 195 countries and territories from 1990 to 2015. Therefore when the current study has tried to select bottom 20 and top 20 countries according to HAQ 2015 score and SDI quartiles the whole scenario becomes clearer for viewing countries

apart from traditional human development index (HDI).

The current study has also tried to follow Hans's footsteps. Recently he reiterated that poverty, inequality, lack of financing and poor governance are major causes of health problems<sup>7</sup>. The

HDI-Rank 2015	Health expend /GDP (%)	Domn. Govt. health spending /total health spending (%)	Prepaid private spending /total health spending	Out-of-pocket spending /total health spending (%)	Dev. Assist./total health spending	Health spending/capita change 1995-2014 (%)	Physician /10 000 (2015)	Nurse Midwives /10 000 (2015)
174	5.5	26.9	0.0	28.4	44.7	7.6	0.3	2.5
158	3.7	29.5	0.0	34.3	36.2	-0.4	1.6	22
181	7.8	10.6	0.0	8.5	80.2	7.4	0.4	4.1
167	5.1	35.0	0.6	35.5	29.6	2.0	0.6	7.7
163	18.1	0.9	64.8	16.4	18.0	9.3	1.2	13.1
185	5.0	35.8	0.0	38.6	25.6	2.8	0.5	5.7
171	5.3	22.1	8.2	54.6	15.1	0.2	1.4	4.8
179	13.5	5.1	9.2	50.1	35.6	3.0	0.2	1.7
187	6.7	26.3	0.0	49.5	24.2	0.6	0.2	1.4
184	8.3	23.7	0.0	19.1	57.2	3.2	0.3	1.8
176	4.5	21.3	0.0	37.4	41.3	2.9	0.9	9.6
181	3.6	21.0	0.0	40.7	38.3	1.8		
183	7.4	20.4	0.0	34.5	45.1	3.5	0.9	5.1
163	0.1	0.0	29.6	29.6	40.8	-1.8	0.2	10.7
179	5.1	23.4	0.0	35.2	41.4	-1.1	0.5	6.2
186	3.8	48.5	1.3	37.2	12.9	0.6	0.5	3.1
178	5.3	6.0	0.0	52.1	41.9	-3.0	0.7	5.9
NA	6.9	25.0	1.2	28.5	45.2	1.9	0.2	2.7
169	9.7	15.0	0.0	54.1	30.9	5.5	2.7	5
188	5.7	9.0	0.0	34.2	56.7	-1.3	0.5	2.6

† 2010. Data not available for 1990, NA = not available. HAQ = Health Access Quality index. HDI = Human development index. Expenditure per gross domestic product (%), Domestic government health spending per total health spending (%), Prepaid private spending per total health spending (%), Out-of-pocket spending per total health spending (%), Development assistance for health per total health spending (%) and Annualized rate of change in total health spending per capita, 1995-2014 (%)

current study has demonstrated that for example, Mozambique has received 80.2% development assistance for health per total health spending, with a -0.4% decrease in annualized rate of change in total health spending per capita, 1995-2014. Mozam-

bique has better HAQ 2015 score of 43 than that of Côte d'Ivoire 42. Mozambique has 2.82 annual growth of HDI, 9.8 HAQ score increase during 1990-2015. Côte d'Ivoire has only 0.79 annual growth of HDI, 6.9 HAQ score increase during 1990-2015. But

Table 2. Healthcare, health systems and development scenario of top 20 countries ranked by HAQ index 2015.

Top 20 countries	HAQ index 2015	HAQ index 1990	HAQ index 2015	HAQ 2015-1990	HDI-score-1990	HDI-Rank-1990	HDI-score 2015
Andora	95.0	84.7	94.6	9.9	0.819 †		0.858
Iceland	94.0	81.9	93.6	11.7	0.77		0.921
Switzerland	92.0	81.4	91.8	10.4	0.986	3	0.939
Sweden	90.0	80.4	90.5	10.1	0.987	2	0.913
Norway	90.0	77.5	90.5	13.0	0.983	6	0.949
Australia	90.0	78.0	89.8	11.8	0.978	7	0.939
Finland	90.0	75.4	89.6	14.2	0.967	11	0.895
Spain	90.0	73.9	89.6	15.7	0.965	16	0.884
Netherlands	90.0	79.2	89.5	10.3	0.984	4	0.924
Luxemborg	89.0	74.5	89.3	14.8	0.782		0.898
Japan	89.0	78.3	89.0	10.7	0.996	1	0.903
Italy	89.0	76.2	88.7	12.5	0.966	14	0.887
Ireland	88.0	81.9	93.6	11.7	0.961	17	0.923
Austria	88.0	74.4	88.2	13.8	0.961	18	0.893
France	88.0	74.3	87.9	13.6	0.974	8	0.897
Belgium	88.0	75.4	87.9	12.5	0.966	15	0.896
Canada	88.0	78.9	87.6	8.7	0.983	5	0.920
Slovenia	87.0	71.2	87.4	16.2	0.767		0.89
Greece	87.0	76.5	87.0	10.5	0.949	22	0.866
Germany	86.0	73.1	86.4	13.3	0.967	12	0.926

Mozambique has only 0.4 physicians and 4.1 nurse-midwives per 10 000 populations, while Côte d'Ivoire has 1.4 physicians and 4.8 nurse-midwives per 10 000 populations. Even these two countries have no big difference in HAQ 2015 score but the health care

financing and health systems variable demonstrate real differences.

The UNDP includes life expectancy at birth, expected years of schooling, mean years of schooling and per capita gross national income (GNI per capita) for estimating human develop-

HDI-Rank 2015	Health expend /GDP (%)	Domn. Govt. health spending /total health spending (%)	Prepaid private spending /total health spending	Out-of pocket spending /total health spending (%)	Dev. Assist./ total health spending	Health spending/capita change 1995-2014 (%)	Physician /10 000 (2015)	Nurse Midwives /10 000 (2015)
32	8.1	78.0	6.0	15.9	0.0	2.5	40	47.7
9	8.7	82.3	0.0	17.7	0.0	2.3	34.9	155.9
2	12.8	60.3	15.2	24.5	0.0	3.2	40.5	173.6
14	11.8	85.1	0.6	14.2	0.0	4.0	39.3	110.5
1	10.0	83.1	3.7	13.2	0.0	3.3	42.8	172.7
2	9.0	70.4	9.9	19.7	0.0	3.3	32.7	106.5
23	9.3	78.0	3.1	18.9	0.0	3.1	29.1	108.6
27	9.0	71.1	4.8	24.1	0.0	2.6	49.5	56.7
7	10.7	88.4	6.3	5.3	0.0	3.9	33.5	83.8
20	6.9	83.9	5.5	10.6	0.0	3.2	29	126.1
17	10.2	83.6	2.4	13.9	0.0	3.0	23	114.9
26	9.0	77.4	0.9	21.7	0.0	1.8	37.6	64.7
8	7.6	67.6	14.3	18.1	0.0	4.6	26.7	12.4
24	11.2	78.0	5.8	16.2	0.0	2.6	48.3	79.1
21	11.3	79.9	13.6	6.5	0.0	2.0	31.9	93
22	10.6	77.9	4.3	17.8	0.0	3.3	29.9	167.6
10	10.3	72.1	14.1	13.8	0.0	2.4	20.7	92.9
25	9.1	73.2	14.5	12.3	0.0	3.5	25.2	84.6
29	8.1	61.7	3.4	34.9	0.0	0.9	62.5	34.4
4	11.2	77.3	9.4	13.3	0.0	2.6	38.9	114.9

† 2010. Data not available for 1990, NA = not available. HAQ = Health Access Quality index. HDI = Human development index. Expenditure per gross domestic product (%), Domestic government health spending per total health spending (%), Prepaid private spending per total health spending (%), Out-of-pocket spending per total health spending (%), Development assistance for health per total health spending (%) and Annualized rate of change in total health spending per capita, 1995-2014 (%)

ment index (HDI). On the contrary SDI has included average income per person, educational attainment and total fertility rate and emerges as the most appropriate index to compare health outcomes across countries. When countries ranked by HAQ sco-

re including individual health care access and quality improvement across the development spectrum (SDI quartiles) the dream of stalwarts like Hans Rosling and Christopher Murray become more close to truth considering both development and health out-

Table 3. Healthcare, health systems and development scenario of BRICS countries and USA..

Countries	HAQ index 2015	HAQ index 1990	HAQ index 2015	HAQ 2015-1990	HDI-score-1990	HDI-Rank-1990	HDI-score 2015
Brazil	65.0	50.1	64.9	14.8	0.784	51	0.754
Russia	72.0	61.4	71.7	10.3	0.92	26	0.804
India	45.0	30.7	44.8	14.1	0.439	94	0.624
China	74.0	49.5	74.2	24.7	0.716	65	0.738
South Africa	52.0	45.6	52.0	6.4	0.621	62	0.666
USA	81.0	73.7	81.3	7.6	0.961	19	0.920

comes more accurately measurable. The HAQ Index, if paired with other health-system measures could lead an unparalleled road for universal health coverage. Countries can get a secured channel for strengthening individual health care quality and access, may be in the entire world. In the current study three tables have provided a clear insight that HDI has not properly reflected the scenario of major health care and health systems variables while the HAQ has succeeded to reflect that. Therefore in a broader perspective, the current paper for bottom and top 40 countries and for BRICS countries has demonstrated, followed by Hans Rosling philosophy that SDI is better option for assessing development and health outcomes. Hans has taught to view complex system simply. In the current study the tables have aptly demonstrated the complex

health and development spectrum of the selected countries in a simple and lucid way.

#### A note on the text

To familiar the readers with GBD terms the variables in the tables are kept same as in the HAQ paper.

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HDI-Rank 2015	Health expend /GDP (%)	Domn. Govt. health spending /total health spending (%)	Prepaid private spending /total health spending	Out-of pocket spending /total health spending (%)	Dev. Assist./ total health spending	Health spending/capita change 1995-2014 (%)	Physician /10 000 (2015)	Nurse Mid-wives /10 000 (2015)
79	8.3	45.9	28.5	25.5	0.1	3.3	18.9	76
49	7.1	51.8	2.8	45.5	0.0	5.4	33.6	45.7
131	4.5	31.3	2.4	65.6	0.7	6.4	7	17.1
90	5.1	60.3	5.0	34.6	0.0	10.4	14.9	16.6
119	8.9	47.0	44.2	6.4	2.4	2.1	7.8	51.2
10	16.6	49.8	38.8	11.4	0.0	2.9	25.5	98.9

† 2010. Data not available for 1990, NA = not available. HAQ = Health Access Quality index. HDI = Human development index. Expenditure per gross domestic product (%), Domestic government health spending per total health spending (%), Prepaid private spending per total health spending (%), Out-of-pocket spending per total health spending (%), Development assistance for health per total health spending (%) and Annualized rate of change in total health spending per capita, 1995-2014 (%)

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