

Title: Indexing healthcare access and quality for surgically-treatable conditions in 0-14 years old children across 204 countries and territories from 1990 to 2019

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Purpose: Building on past frameworks, our aim was to systematically analyze the healthcare access and quality (HAQ) index for surgically treatable conditions in children (0-14 years age group) across 204 countries and territories from 1990 to 2019.

Methods: Data was obtained from the Global Burden of Disease 2019 study. Of the 28 conditions included in the HAQ index for the 0-14 years age group, 9 were considered surgically treatable following the existing framework by Wurdeman and colleagues. We used age-group-specific mortality-to-incidence ratios and risk-standardized death rates. An easily interpretable, computable, and partially compensatory composite index ranging from 0 (worst) to 100 (best) was constructed using the adjusted Mazziotta Pareto index methodology. The indicators were scaled by min-max scaling, aggregated using arithmetic mean, and the aggregate was penalized for imbalance using a variance term. Similarly, a non-surgical HAQ index was calculated including the 19 remaining conditions. To track progress over time, relative change was calculated as the ratio of surgical HAQ in 2019 to that in 1990. Further, relative odds were calculated for surgical to non-surgical HAQ ratios. For odds and ratios, values >1 depicted improvement over time.

Results: In 2019, the surgical HAQ for children varied from 39.87 for Chad to 99.41 for San Marino (**Figure**). The surgical HAQ for children showed the largest relative improvement for Haiti (ratio=4.41) from 1990 to 2019 while Chad saw a small worsening (ratio=0.94). The relative odds compared to nonsurgical HAQ ranged from 0.38 for Liberia to 2.12 for Haiti. Index values, relative ratios, and odds across World Bank country income groups are summarized in the **Table**.

Conclusion: In this first systematic analysis, we present an index that is valuable for global assessments, policymaking, and advocacy for pediatric surgery. Future studies should conduct sensitivity, uncertainty, and validation analyses.

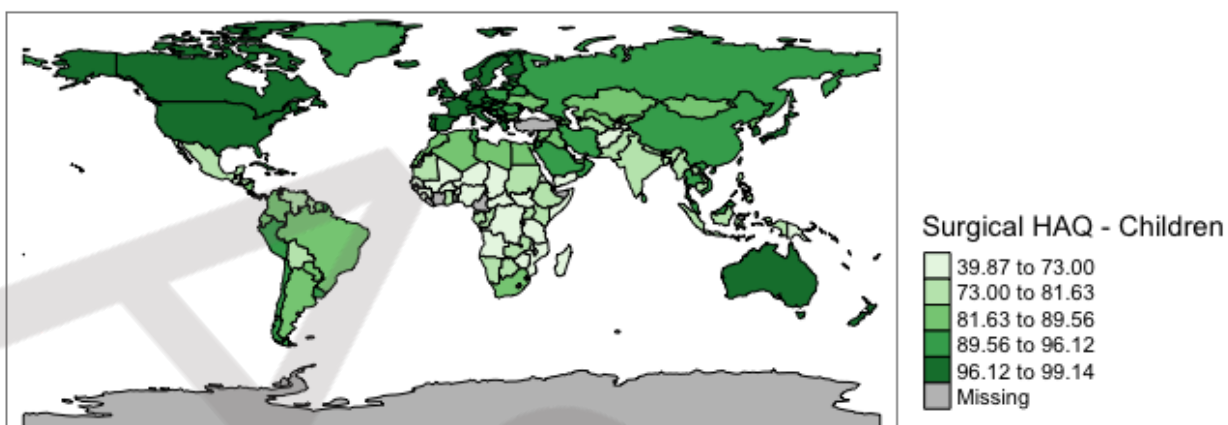


Figure: Surgical HAQ index (0-100) for children in the 0-14 years age group across 204 countries and territories in 2019.

Table: Variations across World Bank Country Income Groups for outcome variables note rapid wide ranges but greater progress for middle-income country groups. Country groups could not be assigned to 3 countries.

Group	Median Surgical HAQ Index for 2019 [Min, Max]	Median Relative Ratio for Surgical HAQ for 2019 to 1990 [Min, Max]	Median Relative Odds for Surgical to Non-surgical HAQ [Min, Max]
High-Income Countries (HICs, n=67)	97.26 [76.24, 99.41]	1.08 [1.03, 1.29]	1.02 [0.96, 1.07]
Upper-Middle-Income Countries (UMICs, n=53)	86.43 [63.10, 96.18]	1.14 [1.02, 2.59]	1.04 [0.75, 1.85]
Lower-Middle-Income Countries (LMICs, n=53)	78.21 [55.58, 94.12]	1.20 [0.95, 4.41]	0.99 [0.56, 2.12]
Low-Income Countries (LICs, n=28)	69.12 [39.87, 87.72]	1.25 [0.94, 2.20]	0.83 [0.38, 1.20]



Indexing healthcare access and quality for surgically-treatable conditions in 1-14 years old children across 204 countries and territories from 1990 to 2019

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Abstract
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Introduction

We analyzed the healthcare access and quality (HAQ) index for surgically treatable conditions with preventable mortality in children (0-14 years age group) across 204 countries & territories from 1990 to 2019.

Methods

Source: Global Burden of Disease 2019

Methodology: Adjusted Mazziotta-Pareto Index; 0 (worst) -100 (best)

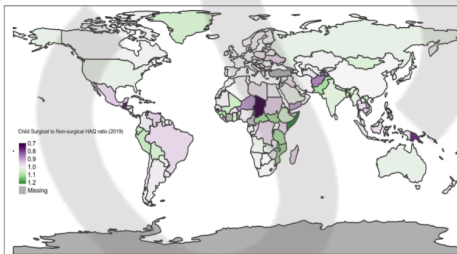
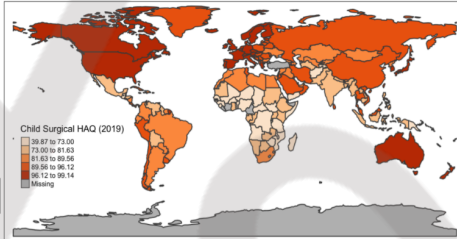
Outcomes:

Surgical HAQ (9 conditions)
Non-surgical HAQ (19 conditions)

Relative change = Surgical HAQ 2019/Surgical HAQ 1990

Relative gap = Surgical HAQ 2019/Non-surgical HAQ 2019

Results



In 2019, surgical HAQ for children varied from 39.87 for **Chad** to 99.41 for **San Marino**. **Haiti** showed the largest relative **improvement** from 1990 to 2019 (ratio=4.41). **Chad** saw a small **worsening** (0.94). The 2019 **relative gap** between surgical & nonsurgical HAQ indices was smallest for **Chad** (ratio=0.70) & greatest for **Somalia** (1.22).

Conclusions

We present a novel index analysis valuable for global assessments, policymaking & advocacy. Future studies should conduct sensitivity, uncertainty & validation analyses. Scan QR for references, acknowledgements, disclosures, & contact.



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