PCMH Environmental Scan – Children's Movement Behaviours & Mental Health

EXECUTIVE SUMMARY

PREAMBLE

Clear evidence shows that regular physical activity, less sedentary behaviour, and sufficient sleep (i.e., 24-hour movement behaviours) are linked to improved mental health. However, most research exploring these associations has looked solely at individual movement behaviours (i.e., either physical activity, sedentary behaviours, or sleep). Publication of the world's first 24-hour movement behaviour guidelines, for children and youth in 2016,[1] for the early years in 2017,[2] and for adults in 2020[3] has led to a paradigm shift, and the recognition that 'the whole day matters' for population health surveillance, health promotion initiatives, and the development of individualized lifestyle guidance.

One concern with this new approach is that promoting change across all three behaviours as opposed to one at a time may be overwhelming for the individual and may lead to disengagement.[4] A solution may be the use of a composite score or index; combining all three individual behaviours together to create a single summary measure. Increasingly, composite scores are being recognized as useful tools for individual and population health decision-making[5] and as effective individualized goal setting tools.[6]

Missing from our understanding is whether such pediatric health indices (or related tools) focused on integrative movement behaviours and mental health/wellness outcomes exist in the grey literature and/or in public health practice.

OBJECTIVES

To conduct an environmental scan exploring whether pediatric health indices focused on integrative movement behaviours and mental health/wellness outcomes exist in the academic and grey literature and/or in public health practice.

METHODS

We applied the "formal searching" environmental scan method, first outlined by Choo,[7] and subsequently used by others.[8,9]Formal searching is considered the most robust and systematic scanning approach. It involves an active effort to seek out information while keeping an openness towards unanticipated findings.[9]

We systematically searched the scientific and grey literature for pediatric health indices that focused on integrative movement behaviours (i.e., physical activity, sedentary behaviours, sleep) in relation to mental health/wellness outcomes.

We adopted a "if/then" conditional iterative approach to this scan. For example, *if* we did not find anything specific to children integrative movement behaviours and mental health, *then* we

looked to see if anything similar existed in the adult literature. *If* not with adults, *then* we looked for indices examining individual movement behaviours (or other health behaviours, if needed) in children. Our assumption was that we would find few if any indices related specifically to integrative movement behaviours and mental health/wellness. This strategy was therefore used to maximize our search results so that in the event few or no results were found on our specific topic, we could use existing indices broadly related to our topic to build a knowledge base.

Academic Literature Search Strategy

Academic databases, such as CINAHL and MEDLINE, were searched by one member of the research team. This search was conducted between June 17 and July 28, 2022 using the terms: children, youth, index(ice), 24-hour movement behaviours, integrated movement behaviours, physical activity, sedentary behaviours/time, screen use, and sleep. The Boolean operator "and" was applied to combine all terms. Only articles published in English or French were included, and no date restrictions were applied.

Grey Literature Search Strategy

To help round out the academic searches, grey literature was reviewed to expand our searches to examine practice- and industry-based resources. The ACM Digital Library and IEEE Explore were reviewed for potentially relevant e-health, computer science, and engineering resources. A generic Google search was also carried out in a final attempt to capture any additional sources, paying particular attention to online resources developed for government, education, community, or research organizations. Like Jenkins and colleagues (2020), the first 20 links populated by Google were screened for relevance. When a website relevant to movement behaviours and mental health was identified (and then later adopting our conditional eligibility criteria), the next 10 links were reviewed until no additional relevant links were identified. These searches were carried out from July 30 to August 5, 2022.

Data Extraction

A data extraction tool was created to record and organize information from relevant papers or sources of information.

Data Synthesis and Analysis

Data from relevant papers and resources were analyzed and presented in tabular format, and key themes or patterns across identified resources were reported.

FINDINGS

Review of the scientific literature resulted in a single record that met our eligibility criteria. Dumuid et al.,[11] created an interactive app to translate how time reallocations within a 24-hour day are associated with better or worse health measures (i.e., academic performance, body fat percentage, and psychosocial health) among children and youth. Psychosocial health was assessed using the PEDQL Psychosocial Health Summary Score and movement behaviours were self-reported.

Review of the grey literature also produced a single record that met our eligibility criteria. In Supplemental Table 1, a description of the 'alternative' indices (i.e., those retrieved using our conditional search strategy) are presented. A total of 48 health indices were identified: 1 examined 24-hour movement behaviours; 5 examined physical activity, 2 examined sleep, 1 examined workplace wellness, 3 examined cardiovascular and cardiometabolic health, and 36 examined overall health and well-being. Most indices were created for adults only (60%, 28/48), followed by any/all populations (40%, 19/48). Most indices (74%, 35/48) were created by investigators for clinical purposes.

DISCUSSION – KEY LEARNINGS

Composite health indices or scores are gaining popularity in the public health sector to create a wider perspective in order to assess and monitor the magnitude of the broader population health problem as they develop.[11] In the context of health policy discourse, composite health indicators are an excellent means of promoting statistical comparability within and among health care systems; this was confirmed by the overall ethos gleaned from all the health indices captured from the environmental scan. Based on the findings of this environmental audit, only one publicly available interactive tool was identified which visually demonstrates the association between time-use compositions of movement behaviours and various health outcomes for children and youth.[10] However, because this tool did not produce a singular measure that provides a meaningful score or index related to combined movement behaviours and mental health outcomes for any populations, this remains a novel opportunity for population health researchers and policy analysts, among others, to utilize the 24-hour movement guidelines for health promotion and disease prevention efforts. The value and application of such individualized (precision) assessments remain unexplored.

Strengths and Limitations

A major strength of this environmental scan was the robustness of the search and the review of both the scientific and grey literature. Limitations include limiting our searches to English and French resources as well as the absence of a refined approach to searching for grey literature (particularly via Google search engine). However, we did adhere to other published approaches to help formalize this process as much as possible.[8] [9]

CONCLUSIONS

The aim of this environmental scan was to explore whether pediatric health indices focused on integrated movement behaviours and mental health/wellness outcomes exist in the academic and grey literature and/or in public health practice. Only one resource was identified. The findings of this scan suggest an important gap in both the academic literature and practice remains, necessitating the development of a composite indicator of movement behaviours on all health measures in children, including mental health.

References

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Supplementary Table 1. Description of existing health indices captured from environmental scan.

Name of Index	Target Population	Index Description	Metric and Application
24-Hour Movement Behaviours			
'Your Best Day' https://dorotheadumuid.shinyapps.io/Design_Your_Best_Day/	Children (5-17 years)	An interactive mobile application (app) that translates how time reallocations within a 24-hour period are associated with health measures, specifically: body fat percentage, psychosocial health, and academic performance.	Does not provide a singular index score; however, as users interact with the app and input their sleep, physical activity and screen use data, visual time-use compositions are created and change scores (increase/decrease) for health measures presented.
Physical Activity			
ACSM American Fitness Index https://americanfitnessindex.org/	General population (100 largest USA cities)	Ranks the 100 largest cities in the United States according to variables that reflect and affect physical activity, physical fitness, health, and quality of life of community members. Public health databases serve to develop the Fitness Index and include such components as: percent of adults exercising in the last 30 days, percent with obesity, percent who live within 10 minutes of a park and percent walking or biking to work. The Fitness Index provides information to civic and public health leaders regarding the "health" of their city and citizens and serves as a baseline or benchmark for cities to aspire to and measure progress towards.	The Fitness Index ranks America's 100 largest cities from 1-100 (with 1 being the highest level of physical activity, physical fitness, and quality of life). Cities receive an overall ranking, a personal health ranking, and community health ranking based on a set of indicators of physical activity, physical fitness, health, and quality of life.

Name of Index	Target Population	Index Description	Metric and Application
General Practice Physical Activity Questionnaire http://www.al-nasir.com/www/PharmCalc/exec_calc.php?ID=GPPAQ	Adults (16-74 years)	The General Practice Physical Activity Questionnaire is intended for use in adults in routine general practice to provide a simple, 4-level Physical Activity Index reflecting an individual's current physical activity. The index can be cross-referenced to read codes for physical activity and can be used to help inform the decision as to when interventions to increase physical activity might be appropriate.	Patients can be classified into four categories based on the original EPIC index from which the GPPAQ was developed: inactive, moderately inactive, moderately active, or active.
PAI Health (Personal Activity Intelligence) https://www.paihealth.com/	General population	PAI (Personal Activity Intelligence) is a science-backed health score that measures the heart health impact of physical activity. It gives you a personalized score, based on your profile and heart rate data to tell you if you're doing enough. It measures what matters and keeps you motivated. Derived from one of the world's largest health studies to develop a single, easy-to-understand personalized activity tracking metric, the PAI algorithm helps everyday people manage their health.	The proprietary algorithm calculates a PAI Score using personal profile data and heart rate data on a rolling 7-day basis. Maintaining a weekly PAI Score of 100 or more is associated with an average 25% reduction in the risk of cardiovascular disease mortality.
Physical Activity Index	General population (Canada)	The index includes data on the population aged 12 and over who reported a level of physical activity, based on their responses to questions about the frequency, nature, and	The index is calculated as the sum of the average daily energy expenditures of all activities. Respondents are classified as follows: 3.0 kcal/kg/day or more =

Name of Index	Target Population	Index Description	Metric and Application
		duration of their participation in leisure time physical activity. Respondents are classified as active, moderately active or inactive based on an index of average daily physical activity over the past 3 months.	physically active; 1.5 to 2.9 kcal/kg/day = moderately active; less than 1.5 kcal per day = inactive.
Sprout Health Index	General population	The health index score is derived from 10 questions and 7 days of activity data from an activity tracking device or app. The health scores and risk scores are derived from a combination of variables such as how much a person moves, their age, gender, height, and responses to the personal and family health history questions.	People are categorized into different health brackets based on their overall score: 0-49: Poor 50-61: Fair 62-73: Good 74-85: Very Good 86-100: Excellent
		Sleep	
Pittsburg Sleep Quality Index https://www.opapc.com/uploads/documents/PSQI.pdf	General population	The Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval. Nineteen individual items generate seven "component" scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of scores for these seven components yields one global score.	19 self-rated items are combined to form seven "component" scores with a range of 0-3 points each. In all cases, a score of "0" indicates no difficulty while a score of "3" indicates severe difficulty. The 7 component scores are then added to yield one "global" score with a range of 0 – 21 points. "0" indicates no difficulty and "21" indicates severe difficulty in all areas.

Name of Index	Target Population	Index Description	Metric and Application
Sleep Health Index https://www.sleepfoundation.org/shi	Adults	Measures sleep health on three key scales: sleep duration, sleep quality, and sleep disorders.	Validated survey asks questions assigned to 3 discrete domains: sleep duration, sleep quality, and sleep disorders. Resulting overall scores range from 1 - 100 (higher score reflects better sleep health).
Workplace			
Total Health Index (THI) http://howatthr.com/wp-content/uploads/2014/01/THI-FAQ-Dec-14-2015-Master.docx.pdf	Employees (Adults)	Employee survey tool that provides organizations with evidence-based metrics related to their employee and organizational health risks. It identifies areas of greatest opportunity and strength that will impact employees' and employer's health, productivity, and engagement. The THI examines four key pillars – physical, mental, workplace, and life.	The Total Health index is a behavioral assessment that measures four pillars that collectively provide the individual with a resiliency score: their Total Health Index. The higher the THI score, the higher the likelihood the employee is capable of consistently working at their full potential
Cardiovascular and Cardiometabolic			
Body Mass Index (BMI) BMI-for-age percentile	Adults Children and youth	Body mass index (BMI) is a simple calculation of an individual's weight (in kilograms), divided by the square of their height (in meters). For children and youth, BMI is typically standardized for age and sex (using BMI percentiles).	Adults Underweight = below 18.5 Healthy weight = 18.5-24.9 Overweight = 25-29.9 Obese = 30+

Name of Index	Target Population	Index Description	Metric and Application
		Effective measure of population health to identify cardiometabolic risks.	Children and Youth Underweight = less than the 5th percentile Healthy Weight = 5th percentile to less than the 85th percentile Overweight = 85th to less than the 95th percentile Obesity = equal to or greater than the 95th percentile
CANHEART Health Index http://www.cmaj.ca/content/186/3/180	General population (Canada)	Adults: Examines trends in the prevalence of 6 cardiovascular health factors and behaviours (smoking, physical activity, fruit and vegetable consumption, overweight/obesity, diabetes, and hypertension) A separate CANHEART index was developed for youth ages 12–19 years. This index included 4 health factors and behaviours (smoking, physical activity, fruit and vegetable consumption and overweight/obesity).	The presence of each ideal health behaviour or factor is assigned a value of 1 for an ideal state and 0 for a non-ideal state. These values are summed to create the CANHEART health index score. Scores range from 0 (worst) to 6 (best heart health) among adults and 0 (worst) to 4 (best heart health) among youth.
Cardiovascular Disease Index (CVD Index) https://www.nmqf.org/nmqf-indexes/cardiovascular-disease-index#:~:text=The%20Cardiovascular%20Disease%20Index%20(CVD,gender%2C%20and%20race%2Fethnicity	General population (USA)	The Cardiovascular Disease Index (CVD Index) provides interactive statistical information on CVD nationwide and at the regional, state, county, metropolitan, legislative-district, and zip-code levels, as well as by age, gender, and race/ethnicity. Users may create customized maps and graphs to support educational, advocacy, and public-affairs initiatives.	The CVD Index uses data from the following sources: -Behavioral Risk Factor Surveillance System data for 2000 through 2009 -US Census 2000 -The National Minority Quality Forum applies small-area analysis to the data to identify CVD disparities and produce CVD Index maps.

Name of Index	Target Population	Index Description	Metric and Application
		The purpose of the CVD Index is to locate areas where CVD is concentrated as well as to identify affected and at-risk population groups.	
Health and Wellbeing			
Better Life Index http://www.oecdbetterlifeindex.org/#/11111111111	General population	This Index allows you to compare well-being across countries, based on 11 topics the OECD has identified as essential, in the areas of material living conditions and quality of life. The Better Life Index is designed to let you visualize and compare some of the key factors – like education, housing, environment, and so on – that contribute to well-being in OECD countries.	Each flower represents one country, each petal represents one of the 11 topics; the length of the petal represents a country's score in a topic, while its width represents the importance the user has assigned.
Canadian Index of Wellbeing http://www.communityhealthandwellbeing.org/canadian-index-wellbeing	Adults	A research and evaluation framework that examines, tracks, and reports on how people are really doing in respect to the broad determinants of health. Equipped with 64 indicators, the CIW compiles quantitative data on eight interconnected quality of life domains, or categories, Canadians really care about: Community Vitality, Democratic Engagement, Education, the Environment, Healthy Populations, Leisure and Culture, Living Standards, and Time Use.	Assesses overall wellbeing of Canadians by compiling qualitative data on 64 indicators in 8 quality of life domains: Community Vitality, Democratic Engagement, Education, the Environment, Healthy Populations, Leisure and Culture, Living Standards, and Time Use. Shown as percent changes year over year.

Name of Index	Target Population	Index Description	Metric and Application
Canadian Indian Health Status Index	Indigenous populations (Northern Canada)	The Canadian Indian Health Status Index was developed to assist in health care resource allocation for preventive medicine program and to permit participation by the Indians for the selection of health program priorities. It was a revised version of Chen's G index which was developed for the US.	Similar to the G index, the metric of Indigenous health status index represents the health status parity of the target population as compared to the reference population.
Chen's G Index	Adults (subpopulation in the USA)	G Index was developed based on Miller's Q index (1970). It measures the health of disadvantaged minority groups in the USA.	The value of G ranges from zero (which indicates parity of health status) to some positive number (indicating the extent and severity of the disparity). If the target population fares better than the reference population, then G becomes negative.
Chiang's H Index	Hypothetical population	H Index is a mathematical construction for describing the state of health of a well-defined population over a given period of time, such as a calendar year.	H index is a mean duration of health in the range between 0 and 1; the healthier a population is, the larger will be the value of H.
Child Health Index	Children (USA)	The Child Health Index was developed using data from Kids Count Data Book 2002. The index was developed to construct a composite health index that would facilitate statistical analysis by state for overall physical health of children.	The range of scores falls between -3 and 3. Scores closer to 3 represent better health, and those closer to -3 represent poorer health.

Name of Index	Target Population	Index Description	Metric and Application
Dementia-Free Life Expectancy	General population	Dementia-free life expectancy summarises the expected number of years to be lived free of dementia.	Expected years to be lived free of dementia.
Disability-Adjusted Life Expectancy (DALE) / Health-Adjusted Life Expectancy (HALE)	General population	The DALE is a population-based measurement that identifies the vital period expected to be free of disease. The number of years that a newborn can live free of disease is the DALE. As the DALE approaches life expectancy, the burden of disease descends. HALE summarises the expected number of years to be lived in what might be termed the equivalent of full health.	Expected years to be lived free of disability.
Disability-Adjusted Life years (DALY)	General population according to diseases as classified by ICD	DALY was first introduced in the World Development Report 1993 to assess the global burden of diseases. It is a health gap population summary measure that combines years of healthy life lost due to disability with those that are lost from premature death.	Years lost per 1,000 population per year. The comparison was made among the classification of diseases.
Life Expectancy Free of Disability (LEFD)/ Disability-Free Life Expectancy (DFLE)	General population	DFLE combines information of mortality and morbidity. It integrates disability and handicap data into the conventional life table models.	Number of years a population expected to live free of disability.
General Index of Health	Adults (Vancouver, Canada, 12 regions)	General Index of Health was developed as a tool to identify priority geographic areas for the distribution of health resources among residents of the city of Vancouver. It measures the general health of the Vancouver population.	Index score is ranged between 0 to 30 points.

Name of Index	Target Population	Index Description	Metric and Application
Gross National Health Product (GNHP)	General population (USA)	GNHP was developed to overcome the problem of incommensurability of measurement unit in the design of Linder's gross national health deficit. It blends a nation's mortality and disability statistics into a single number in units of disability-free life years per 100,000 population to compare the gross health status of regions.	Units of disability-free life years per 100,000 population. The higher the GNHP value the better.
Happy Planet Index http://happyplanetindex.org/	General population	The Happy Planet Index measures what matters: sustainable wellbeing for all. It tells us how well nations are doing at achieving long, happy, sustainable lives. Wealthy Western countries, often seen as the standard of success, do not rank highly on the Happy Planet Index. Instead, several countries in Latin America and the Asia Pacific region lead the way by achieving high life expectancy and wellbeing with much smaller Ecological Footprints. The Happy Planet Index provides a compass to guide nations, and shows that it is possible to live good lives without costing the Earth.	The Happy Planet Index combines four elements to show how efficiently residents of different countries are using environmental resources to lead long, happy lives. HPI = [(wellbeing (0-10) x life expectancy (average number of years a person is expected to live) x inequality of outcomes (expressed as percentage)]/Ecological Footprint (expressed using a standardized unit: global hectares [gha] per person.)
Handicap-Free Life Expectancy (HFLE)	General population	HFLE summarises the expected number of years to be lived free of handicap.	Expected years to be lived free of disability.
Healthy Life Expectancy (HLE)	General population	HLE summarises the expected number of years to be lived in self-perceived good health.	Expected years to be lived free of disability.

Name of Index	Target Population	Index Description	Metric and Application
Healthy Life Years (HeaLY)	General population	HeaLY is a health gap population summary measure that combines the amount of years of healthy life lost due to death with those that are lost due to morbidity. It was developed to assess the effects of health interventions, some of which may have impact on more than one disease.	Incidence rate per 1,000 population per year; average age at onset; average age at death; expectation of life at age of onset; expectation of life at age of death; case fatality ratio; case disability ratio; extent of disability; duration of disability in years.
Index of Child Mortality (ICM)	Children (1972-1988; compares 15 states in India)	ICM was developed for longitudinal assessment of health status of children. It combines five child mortality indicators.	Decreasing trend of ICM over the years depicts better outcome of child mortality over the years.
Index of Multiple Deprivation	General population	Index of multiple deprivation was used to compare electoral wards regarding deprivation and health. It measures health deprivation at electoral ward level.	Comparative mortality ratios for men and women at ages under 65 y; people receiving attendance allowance or disability living allowance as a proportion of all people; proportion of people of working age receiving incapacity benefit or severe disablement allowance; age and sex standardised ratio of limiting long-term illness; proportion of low birth weight (<2.5kg).
Inequity-in-Health Index (IHI)	General population	IHI is a bi-dimensional composite index allowing inequity in health to be quantitatively estimated and graphically represented in countries and regions around the world. It measures health inequity in countries assuming inequity as "inequality of health outcomes".	IHI scores are presented in the range of 0 Pi to 1 Pi, with higher area scores indicating higher inequality of health outcomes. Ranking was made according to country area scores.

Name of Index	Target Population	Index Description	Metric and Application
K Index	Hypothetical community of 1,000 people	The K index was developed to measure the quality of health care. It combines measure of incidence, severity, and concentration of sentinel health events (SHE) in communities. An SHE is a preventable disease, disability, or untimely death whose occurrence serves as a warning signal that the quality of preventive and/or therapeutic medical care may need to be improved.	K scores in the range of the normative standards (the lowest score) to 1. The lowest score is the one with a health care system that has been most effective at preventing SHEs.
Life Expectancy Free of Avoidable Mortality (LEFAM)	General population (Spain; 1983-1986)	LEFAM combines the concept of avoidable deaths with life expectancy. It measures the mean years an individual is expected to live if the health system is as efficient as it should be.	Expected life free of avoidable mortality in years.
Miller's Q Index	Indigenous people (sub-population in USA)	The Q index was developed as a tool to assist decision making with regard to program priorities by using the approach of management science. It combines mortality and morbidity in a single index to help distinguish the diseases that are amenable to treatment from those that are not.	Computed Q values were compared between 17 classes of disease according to the International Classification of Diseases. Higher computed Q values represent higher priorities.
Mortality ABC index	General population (compares 130 countries)	The index was developed to add to the inequality debate in the health domain. It measures absolute mortality (A), mortality inequality (B) and mortality clustering (C).	Each country is ranked in terms of permutations of its three-part source (A, B, C).
Plymouth Health District Index	General population	Adaptation of Townsend's overall health index.	Standardised mortality ratio; infant mortality ratio; proportion of residents in private households classified as permanently sick or with a disability.

Name of Index	Target Population	Index Description	Metric and Application
Quality-Adjusted Life Years (QALY)	Adults	QALY was developed to compare expected outcomes for a disease from different interventions. It is a health gap measures that combines duration of life and a measure of quality of life.	Comparison of QALY's can be made among classification of diseases and interventions.
The EIU Outcomes Index	General population (compares 166 countries)	The EIU Outcomes index was developed to measure health outcomes of countries. The outcomes were compared with spending to assess value for money in health care.	The EIU Outcomes index scores range from 0 to 100, with higher scores indicating better outcomes.
Townsend's Overall Health Index	General population	Overall health index was developed to compare the health of population in small areas in Britain. The index was also used to compare with Townsend's deprivation index. Mortality, sickness, and low birth weight data was combined to form the index.	Standardised mortality ratios of population below 65 y (premature mortality); proportion of all residents who classified themselves as permanently sick or with a disability; proportion of live births with low birth weight.
Wellbeing Index (WBI) https://cdn2.hubspot.net/hubfs/488054/what-we-do/well-being-index/9_item.pdf?t=148467624 2370	Adults (USA workers)	Identify distress in a variety of dimensions (fatigue, burnout, low overall quality of life, and suicidal ideation).	WBI: Each of the original 7-item WBI items is answered "yes/no" with 1 point assigned for each "yes" response. A total score (0–7) is calculated by adding the number of "yes" responses (0–7 range with higher score indicative of worse well-being). The total score for the WBI ranges from -2 to 9. Every one-point increase in score results in a stepwise increased probability of distress and risk for adverse personal or professional consequences

Name of Index	Target Population	Index Description	Metric and Application
Wisconsin County Health Rankings	General population (covers 72 counties)	The Wisconsin County Health Rankings was developed to encourage discussion about important population health issues among Wisconsin public health and other policy communities. It measures the health level of each county (population health).	Ranked by overall health outcomes, where county ranked number 1 scored the best overall health outcomes.
World Happiness Index https://worldhappiness.report /		A landmark survey of the state of global happiness that ranks 156 countries by how happy their citizens perceive themselves to be. Six key variables to measure happiness differences: income, healthy life expectancy, having someone to count on in times of trouble, generosity, freedom and trust, with the latter measured by the absence of corruption in business and government.	Countries are ranked from 0-10 (least to most happy).
Composite Index of Anthropometric Failure (CIAF)	Children (India)	The CIAF provides an overall estimate of undernourished children in a population using a composite measure, with the argument that standard indices of stunting, wasting and underweight may each be underestimating the scale of an undernutrition problem. It adapted Svedberg's model of anthropometric failure as an aggregate measure of undernutrition that identifies all undernourished children due to wasting, stunting or underweight.	CIAF scores are presented in the range of 0 to 100 (%).
Global Access to Nutrition Index	Food and beverage manufacturers (22	The Global Access to Nutrition Index focuses on the role that food and beverage manufacturers play in making healthy food	Score of 1-10 (higher the score, the better the performance).

Name of Index	Target Population	Index Description	Metric and Application
http://accesstonutrition.org/index/global-index-2018/	largest in the world)	affordable and accessible to all consumers globally. Respondents are ranked on their nutrition-related policies, practices, and performance. Comprises three components: 1. Corporate Profile: This assesses companies' nutrition- and undernutrition-related commitments and policies, practices, and disclosure in seven categories. 2. Product Profile: This assesses the nutritional quality of the products of the Index companies in nine markets. 3. Business Management System (BMS) Marketing sub-ranking: This assesses companies' policies, practices, and disclosure in relation to BMS marketing.	
Global Nutrition Index (GNI) https://www.ennonline.net/fex/36/global#:~:text=Researchers%20have%20recently%20developed%20a,its%20overall%20level%20of%20nutrition.	General population (compares 192 countries)	The GNI is modelled on the Human Development Index. It is based on three indicators of nutritional status: deficits, excess and food security. The aim of the GNI is to provide a single statistic for each country according to its overall level of nutrition.	A final score between 0 and 1, with higher scores indicating better nutrition (see how this is calculated in column to the left). Countries are ranked based on their score.
The Canadian Nutrient File https://food-nutrition.canada.ca/cnf-fce/index-eng.jsp	Foods (Canada)	A comprehensive, computerized bilingual database that reports up to 152 nutrients in over 5690 foods. The database can help you find values for nutrients such as vitamins, minerals, protein, energy, fat and many more, and is updated periodically. The CNF has an online, searchable application that allows Canadians to search the nutrient values for specific foods.	Average values for nutrients in foods

Name of Index	Target Population	Index Description	Metric and Application
The Overall Nutritional Quality Index (ONQI) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3100735/	General population	The ONQI algorithm is a nutrient profiling scheme that incorporates over 30 dietary components, and aims to rank foods by relative healthfulness.	Scale 1-100 (higher results indicate more favorable effects on health)
Air Quality Health Index (AQHI) https://www.ottawapublichealth.ca/en/public-health-topics/air-quality-and-health-index.aspx	Cities (Ontario, Canada)	The AQHI is a scale designed to help you understand what the air quality around you means to your health.	Scale of 1-10 (the higher the number, the higher the health risk)