Pneumonia & Diarrhea

Progress

Report 2021

JOHNS HOPKINS
BLOOMBERG SCHOOL
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1 IN 4 DEATHS OF CHILDREN UNDER AGE FIVE ARE CAUSED BY PNEUMONIA AND DIARRHEA

Each year, this report tracks progress towards 10 key indicators in the 15 countries with the highest mortality burden of pneumonia and diarrhea in children under age five. These 10 indicators are evaluated and summarized into an overall score based on the WHO integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea (GAPPD).

15 HIGH-BURDEN FOCUS COUNTRIES

ANGOLA	CÔTE D'IVOIRE	INDONESIA	PAKISTAN
BANGLADESH	DRC	MALI	SOMALIA
CHAD	ETHIOPIA	NIGER	TANZANIA
CHINA	INDIA	NIGERIA	

70%
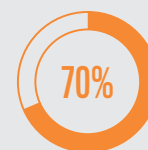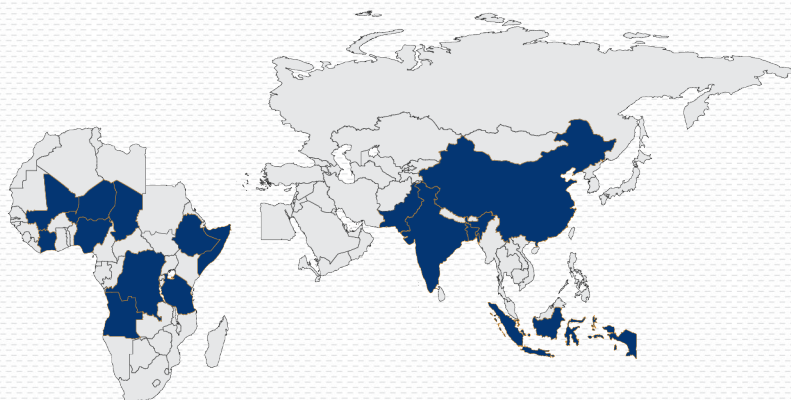
1.24 million children under age five die each year from pneumonia, and **70% of these deaths occur in just 15 focus countries.**

PNEUMONIA AND DIARRHEA ARE AMONG THE LEADING KILLERS OF CHILDREN UNDER AGE FIVE, CAUSING THE EQUIVALENT OF 141 CHILD DEATHS PER HOUR.

Due largely to the impacts of the COVID-19 pandemic, around half of the countries in the report **experienced decreases in immunization coverage.**

However, several countries also **successfully rolled out new vaccines to combat pneumonia and diarrhea.**

MEDIAN 2021 GAPPD SCORES ACROSS 15 FOCUS COUNTRIES

None of the 15 focus countries met GAPPD target scores

	Score
DIARRHEA	41
PNEUMONIA	56
OVERALL GAPPD	48
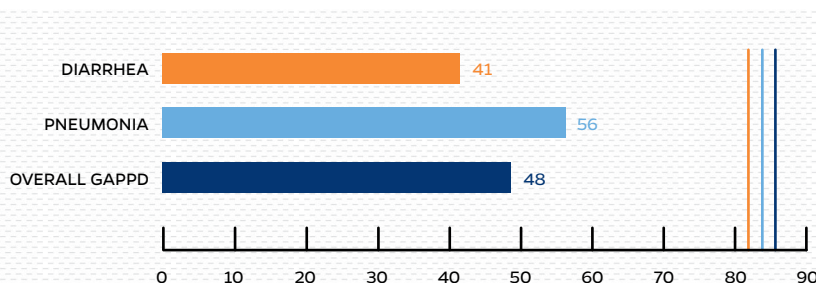
Between 1990 and 2019, the number of children who died before their 5th birthday fell by more than half.[1] However, sustaining this hard-won progress is under dire threat. The direct and indirect effects of the COVID-19 pandemic have threatened the health and well-being of the world's children and although the full impact is still being assessed, the latest data highlight the need for immediate action to prevent catastrophic backsliding against progress in eliminating preventable child deaths.

In 2020, an estimated 1.23 million children under age 5 died from pneumonia and diarrhea[2]—diseases that are highly preventable and treatable with simple, known measures. While vaccines to prevent COVID-19 were developed with cutting-edge technology and distributed at record speeds, highly preventable and treatable infectious diseases like pneumonia and diarrhea continue to kill the equivalent of over 141 children per hour, or 3,400 deaths per day.

The Integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea (GAPPD) outlines a set of core interventions shown to successfully prevent, protect, and treat children who are at risk of serious illness or death due to these leading diseases.[3] Vaccines that prevent pneumonia and diarrhea deaths are key components of GAPPD, but 22.7 million children in the world missed out on vaccination in 2020—3.7 million more than in 2019.[4]

Each year, the International Vaccine Access Center (IVAC) reviews the progress towards achieving these GAPPD targets in the 15 countries with the highest burden of pneumonia and diarrhea deaths among children under 5 years of age, incorporating the latest available data for 10 key pneumonia and diarrhea interventions. Although there are limitations to the indicators, the composite view they provide offers a useful reflection of the overall landscape regarding progress on reducing preventable pneumonia and diarrhea deaths in children under 5.

2021 PDPR FOCUS COUNTRIES

Rank	Country	Under-5 Pneumonia & Diarrhea Deaths
1	India	233,240
2	Nigeria	208,439
3	Pakistan	90,398
4	DRC	64,170
5	Ethiopia	44,692
6	Chad	27,496
7	Indonesia	27,422
8	Angola	25,609
9	Tanzania	25,367
10	Somalia	25,158
11	China	24,254
12	Mali	21,353
13	Bangladesh	21,166
14	Niger	20,048
15	Côte d'Ivoire	18,651

GAPPD Indicators: A country's Overall GAPPD Score reflects the average of all 10 indicators. **The Pneumonia Score reflects the average of 7 pneumonia-specific indicators** • **The Diarrhea Score reflects the average of 5 diarrhea-specific indicators** •

In 2009 and 2013, the World Health Organization (WHO) and UNICEF published GAPPD, a bold call to action with the goal of achieving a global 75% reduction in incidence of severe pneumonia and diarrhea in children under 5 by 2025[3]. GAPPD outlines a set of core interventions to successfully prevent, protect, and treat children who are at risk of serious illness or death due to these two diseases.

PROTECT
Exclusively breastfed for the first 6 months • •

PREVENT
MCV1 Coverage • •
PCV3 Coverage • •
DTP3 Coverage •
Hib3 Coverage •
RotaC Coverage •

TREAT
Appropriate Care Seeking •
Antibiotic Treatment •
ORS •
Zinc •

KEY RESULTS & FINDINGS

Each year we calculate and compare GAPPD scores based upon 10 key indicators to track global progress toward GAPPD targets. Exclusive breastfeeding **PROTECTS** children by making them healthier and less vulnerable to pneumonia and diarrhea. Vaccination against pertussis, measles, Hib, pneumococcus, and rotavirus **PREVENTS** illness and death due to these pathogens that cause pneumonia and/or diarrhea, while access to appropriate health care providers, antibiotics, ORS, and zinc are key interventions to **TREAT** pneumonia and diarrhea.

GAPPD SCORES FOR THE 15 COUNTRIES WITH THE HIGHEST NUMBER OF UNDER-5 PNEUMONIA AND DIARRHEA DEATHS

	Countries with most under-5 pneumonia and diarrhea deaths	Under-5 pneumonia and diarrhea burden (2017)		PROTECT	PREVENT					TREAT				2020 Scores		
				% Exclusive breastfeeding in first 6 months	Vaccine coverage (%)					% of children under 5 with suspected pneumonia		% of children under 5 with diarrhea				
Global rank	Country	Number of deaths	Number of deaths per 1,000 live births		DTP3	MCV1	Hib3	PCV3	RotaC	Taken to an appropriate health care provider	Receiving antibiotics	Receiving ORS	Receiving zinc supplements	Overall GAPPD Score	GAPPD Pneumonia Score	GAPPD Diarrhea Score
				Target: 50%	Target: 90%					Target: 90%						
1	India	233,240	9.3	58*	85	89	85	21	82	78	N/A	51	20	63	69	60
2	Nigeria	208,439	28.4	29	57	54	57	57	0	75	23	40	31	42	50	31
3	Pakistan	90,398	16.6	47	77	83	77	80	80	84	46	37	13	62	71	52
4	DRC	64,170	18.9	54*	57	57	57	58	33	34	40	24	22	44	51	38
5	Ethiopia	44,692	13.6	59*	71	60	71	67	70	31	27	30	33	52	55	50
6	Chad	27,496	43.1	16	52	47	52	0	0	32	18	17	21	26	31	20
7	Indonesia	27,422	5.6	51*	77	76	77	4	0	92*	34	36	37	48	59	40
8	Angola	25,609	20.8	37	51	44	47	47	39	49	N/A	43	0	40	46	33
9	Tanzania	25,367	11.7	59*	86	84	86	80	82	55	61	45	18	66	73	57
10	Somalia	25,158	39.5	34	42	46	42	0	0	23	N/A	N/A	0	23	31	20
11	China	24,254	1.5	21	99*	99*	N/A†	0	0	N/A	N/A	N/A	0	31	44	30
12	Mali	21,353	27.3	40	70	62	70	66	68	71	18	21	15	50	57	41
13	Bangladesh	21,166	6.9	63*	98*	97*	98*	99*	0	46	63	72	44	68	81	55
14	Niger	20,048	19.4	23	81	79	81	81	83	53	11	44	10	55	58	48
15	Côte d'Ivoire	18,651	21	23	80	70	80	79	77	44	30	17	18	52	58	41
MEDIAN				**41**	**72**	**70**	**70**	**49**	**41**	**55**	**34**	**37**	**19**	**48**	**56**	**41**

*Indicates coverage was above target

N/A: Data is unavailable or not reported

Data in this table may differ from that reported in WHO, UNICEF, or national survey sources. Differences of 1-2 percentage points are often due to rounding differences across sources. Data used for this table came from the most recently available sources as of October 2021.

Detailed information about data sources available in appendix on page .

† China has not yet introduced Hib, rotavirus, or pneumococcal vaccines into its national immunization program (NIP); as such, WUENIC estimates indicate 0% coverage for these three vaccines. Hib and rotavirus vaccines are available through the private market. While relatively high private market coverage for Hib vaccine and low coverage for rotavirus vaccine has been reported in some settings, vaccine coverage levels are not well-documented in the private sector. In past reports, because some evidence suggests that private market Hib3 coverage may exceed 50% in some parts of China even though the vaccine has not yet been introduced into the NIP—as opposed to private market coverage for other non-NIP vaccines, for which data is either unavailable or is limited and reflects low coverage—we classified Hib3 coverage as "missing" (noted in the data tables as "private market coverage"). We have applied the same approach this year. China's Hib3 coverage is classified as "missing," and therefore not included in the numerator or denominator for this year's scores.

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Equation

PROTECT		PREVENT		TREAT		
50% * **1**		**90%** * **5**		**90%** * **4**		**86%**
breastfeeding coverage target / indicator	**+**	vaccine coverage target / indicators	**+**	treatment coverage target / indicators	**=**	Overall GAPPD target score

GAPPD sets forth the following coverage targets for its recommended interventions, which countries should strive to achieve:
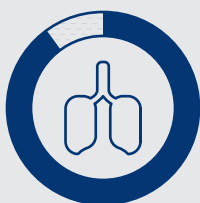
PROTECT
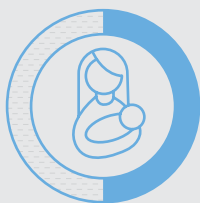
50%

rate of exclusive breastfeeding for the child's first six months of life
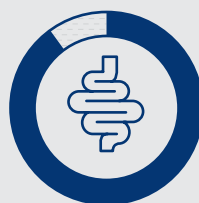
PREVENT

90%

coverage for each of the following vaccines: pertussis, measles, Hib, pneumococcal conjugate, and rotavirus vaccines

TREAT

90%

treatment coverage for children with suspected pneumonia, including care by an appropriate health care provider and antibiotics

90%

treatment coverage for children with diarrhea, including treatment with ORS and zinc supplements

OVERALL GAPPD SCORES

ALL 15 COUNTRIES FAILED TO REACH THE OVERALL GAPPD SCORE TARGET OF 86%

The mean for overall GAPPD score across all 15 countries was 48%, **the same as last year**

FOR 2021, OVERALL GAPPD SCORES RANGED FROM 23% (SOMALIA) TO 68% (BANGLADESH)

This year, **4 countries experienced a decline** in overall GAPPD scores of greater than 1% while 3 **countries experienced an improvement** in overall GAPPD score

INCREASE AND DECREASE IN OVERALL GAPPD SCORE

Countries listed experienced greater than 1 percentage point change in overall GAPPD score from 2020–2021

Country	2021 GAPPD Score	2020 Overall GAPPD	Difference
Angola	40	45	⬇ -5
Indonesia	48	51	⬇ -3
Mali	66	53	⬇ -3
United Republic of Tanzania	66	67	⬇ -2
India	63	61	⬆ +2
Democratic Republic of the Congo	44	40	⬆ +3
Chad	26	22	⬆ +4

GAPPD PNEUMONIA SCORES

NONE OF THE COUNTRIES MET THE GAPPD PNEUMONIA SCORE TARGET OF 84%

The mean for the GAPPD Pneumonia score for all 15 countries was 56%— **a decline from 57% last year**

7 countries experienced a decrease of greater than 1 percentage point and **2 countries experienced an increase**

FOR 2021, SCORES RANGED FROM 31% (CHAD AND SOMALIA) TO 81% (BANGLADESH)

The decline in GAPPD Pneumonia score was largely **caused by declines in immunization coverage across countries in 2020.** Improvements in GAPPD Pneumonia score were largely driven by new MICS and DHS data for treatment and prevention indicators.

INCREASE AND DECREASE IN GAPPD PNEUMONIA SCORE

Countries listed experienced greater than 1 percentage point change in GAPPD Pneumonia score from 2020–2021

Country	2021 GAPPD Score	2020 Overall GAPPD	Difference
Mali	57	61	⬇ -4
Angola	46	50	⬇ -4
Indonesia	59	63	⬇ -4
Côte d'Ivoire	58	61	⬇ -3
India	69	71	⬇ -2
Pakistan	71	73	⬇ -2
United Republic of Tanzania	73	75	⬇ -2
Ethiopia	55	54	⬆ +2
Chad	31	28	⬆ +3

GAPPD DIARRHEA SCORES

ALL COUNTRIES ALSO FELL SHORT OF THE GAPPD DIARRHEA SCORE TARGET OF 82%

The mean GAPPD Diarrhea score for all 15 countries was 41%— **an increase from 40% last year**

The improvement in diarrhea score was largely **driven by substantial increases in rotavirus vaccine coverage** from new introductions in 2019 and 2020

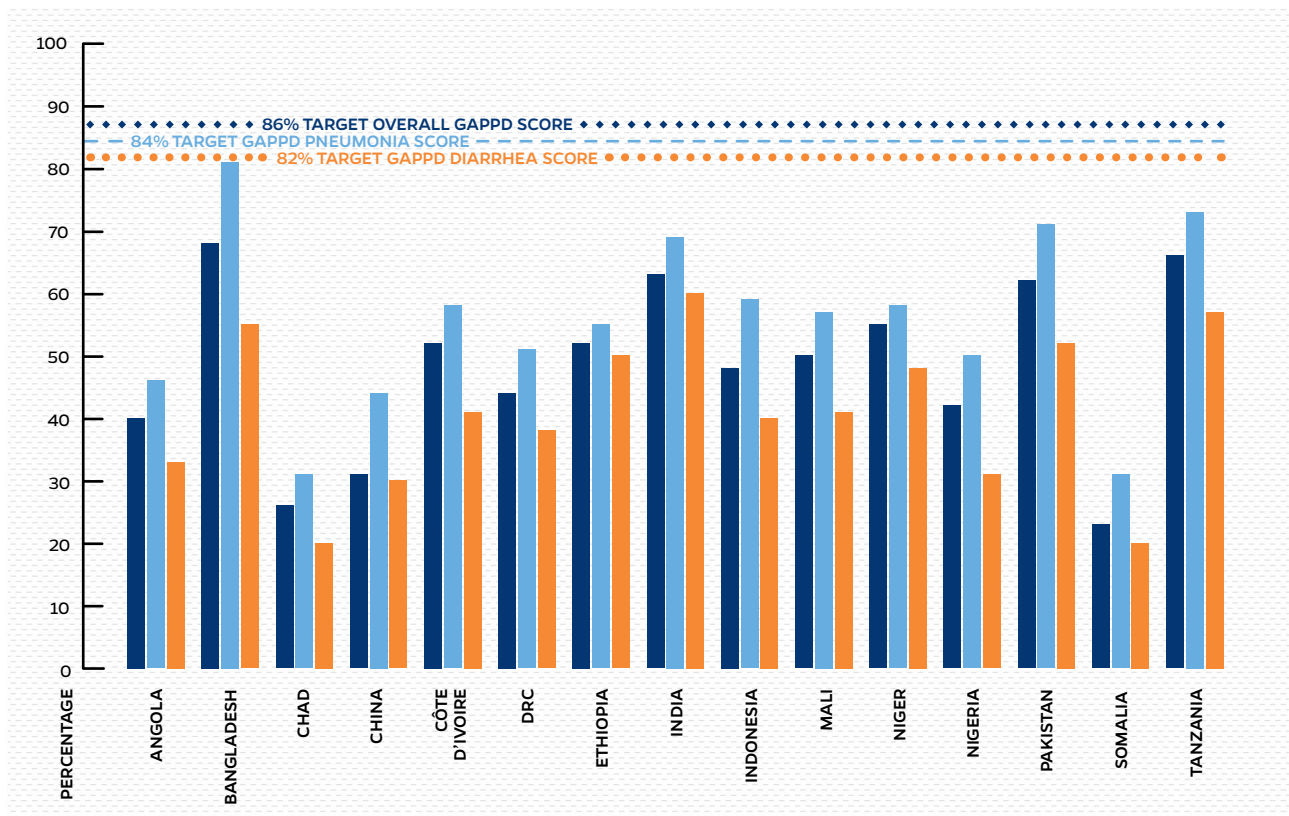**IN 2020, SCORES RANGED FROM 20% (CHAD AND SOMALIA) TO 60% (INDIA)**

INCREASE AND DECREASE IN GAPPD DIARRHEA SCORE

Countries listed experienced greater than 1 percentage point change in GAPPD Diarrhea score from 2020–2021
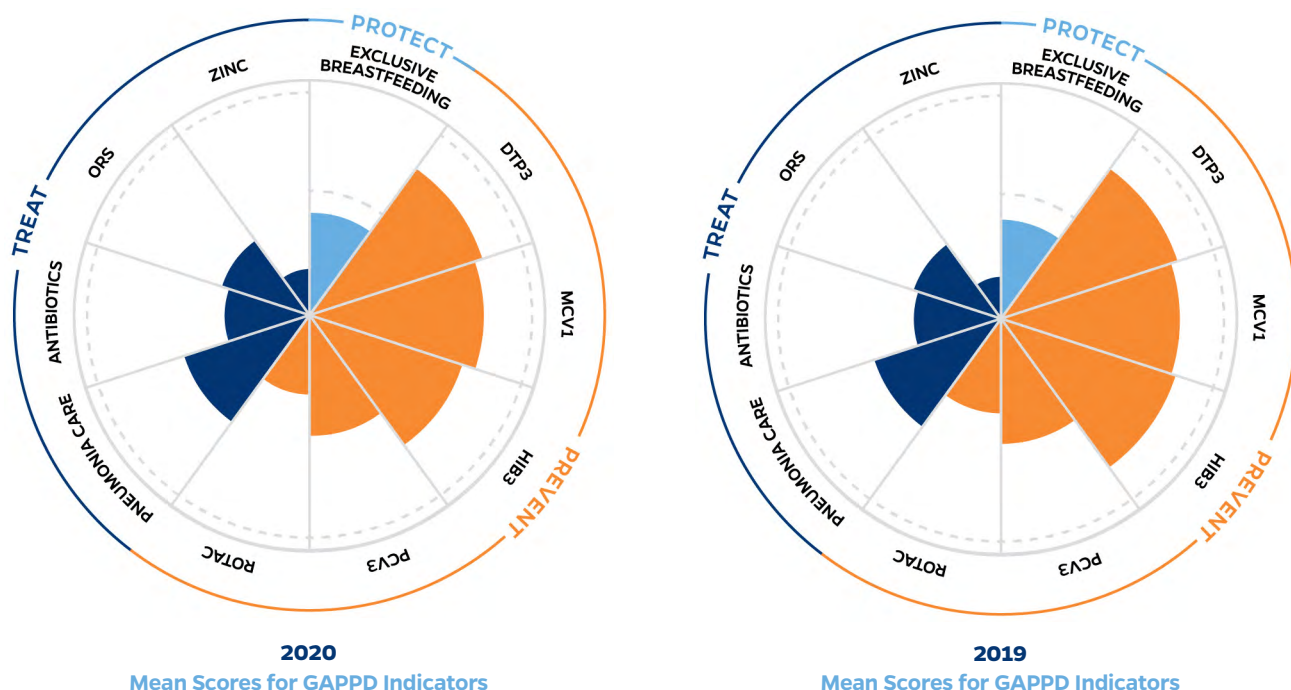
Country	2021 GAPPD Score	2020 Overall GAPPD	Difference
Angola	33	38	⬇ -5
Indonesia	40	42	⬇ -2
India	60	55	⬆ +5
Democratic Republic of the Congo	38	31	⬆ +7
Chad	20	12	⬆ +8

TOTAL GAPPD TARGET SCORES

None of the 15 high burden countries met GAPPD targets

86% TARGET OVERALL GAPPD SCORE
84% TARGET GAPPD PNEUMONIA SCORE
82% TARGET GAPPD DIARRHEA SCORE

Countries: ANGOLA, BANGLADESH, CHAD, CHINA, CÔTE D'IVOIRE, DRC, ETHIOPIA, INDIA, INDONESIA, MALI, NIGER, NIGERIA, PAKISTAN, SOMALIA, TANZANIA

CHANGE IN MEAN COVERAGE BY INDICATOR: IMPACTS OF THE PANDEMIC

2020
Mean Scores for GAPPD Indicators

2019
Mean Scores for GAPPD Indicators

Dashed lines indicated target coverage levels for each indicator (50% for exclusive breastfeeding and 90% for all other indicators)

COUNTRY PROGRESS SUMMARY

From 2020–2021, seven countries saw overall GAPPD score changes of more than two percentage points.

Country	Change	Description
CHAD	⬆ +4	New data from the 2019 MICS reflects improvements in coverage in several indicators including coverage in breastfeeding (an increase of 16 percentage points) and zinc (1% improvement to 21%).
DEMOCRATIC REPUBLIC OF THE CONGO	⬆ +3	DRC's overall score improvement was entirely driven by the introduction of rotavirus vaccine in late 2019 (a change from 0% coverage to 33%). DRC is the first Gavi-supported country in Africa to introduce ROTASIIL®
INDIA	⬆ +2	Continued successful national rollouts of rotavirus (increase from 53% to 82%) and pneumococcal conjugate vaccines (increase from 15% to 21%) led to substantial gains in immunization coverage for these indicators.
UNITED REPUBLIC OF TANZANIA	⬇ -2	Declines across all immunization indicators ranging from 3 – 4 percentage points contributed to a small decrease in overall GAPPD score. However, with an overall score of 66%, Tanzania continues to lead target countries with the second highest overall score.
MALI	⬇ -3	Mali experienced declines of 7 to 8 percentage points across most immunization indicators. However, rotavirus vaccine coverage improved from 63% to 68%.
INDONESIA	⬇ -3	Indonesia experienced declines of 8 to 12 percentage points across several vaccine indicators. The recent PCV roll-out led to an increase in coverage from 3% to 4%.
ANGOLA	⬇ -5	Angola experienced across-the-board decreases in immunization coverage ranging from 6 to 19 percentage points. Rotavirus vaccine coverage was the hardest hit.

DATA & METHODOLOGY

IDENTIFYING THE HIGHEST BURDEN COUNTRIES

For this report, we analyze the progress of 10 GAPPD indicators in the 15 countries with the highest total number of pneumonia and diarrhea deaths among children under 5 years.

These 15 high-burden countries are identified based on the latest data on pneumonia and diarrhea deaths, sourced from the WHO Maternal and Child Epidemiology Estimation (MCEE) group estimates[2]. The most recent publicly available estimates were made available November 2018.

The list of the 15 high-burden countries can shift from year-to-year as new data is made available. Therefore, countries included in our list of high-burden countries may change either due to country progress that results in fewer under-5 pneumonia and diarrhea deaths or adjustments to the methodology used to estimate mortality.

GAPPD INDICATORS

The main sources for data for this report come from WHO and UNICEF data repositories on global child health. The most recent available data are used to compile the national coverage estimates for each of the 10 GAPPD indicators tracked in the report.

We used data collected within the last 10 years to compile national coverage estimates for each of the 10 indicators.

Three key target scores are calculated by averaging the GAPPD coverage target scores for these 10 indicators: a GAPPD Pneumonia score, GAPPD Diarrhea score, and an Overall GAPPD score that includes both pneumonia and diarrhea indicators. These scores can be used to track country progress towards achieving GAPPD coverage targets based upon this selection of proven pneumonia and diarrhea interventions.

DATA SOURCES FOR 10 GAPPD INDICATORS

Indicator	Source
PROTECT	
Exclusive breastfeeding Percentage of infants 0–5 months of age who are fed exclusively with breast milk	UNICEF's global database, Infant and Young Child Feeding: Exclusive Breastfeeding (<6 months); USAID Demographic and Health Survey (DHS), UNICEF Multiple Indicator Cluster Surveys (MICS) or equivalent
PREVENT	
DTP3 3rd dose of diphtheria-tetanus-pertussis (DTP) vaccine	WHO/UNICEF Estimates of National Immunization Coverage (WUENIC)
MCV1 1st dose of measles-containing vaccine	
Hib3 3rd dose of *Haemophilus influenzae* type b (Hib) vaccine	
PCV3 3rd dose of pneumococcal conjugate vaccine (PCV)	
RotaC Final dose of rotavirus vaccine (complete course)	
TREAT	
Pneumonia care-seeking Percentage of children under age 5 with symptoms of acute respiratory infection (ARI) taken to a health care provider	UNICEF's global database, Pneumonia data: Child health coverage
Antibiotics Percentage of children under age 5 with symptoms of ARI who received antibiotics	USAID Demographic and Health Survey (DHS), UNICEF Multiple Indicator Cluster Surveys (MICS), or equivalent
ORS Percentage of children under age 5 with diarrhea who received oral rehydration salts (ORS packets or pre-packaged ORS fluids)	UNICEF's global database, Diarrhea data: Child health coverage
Zinc Percentage of children under age 5 with diarrhea who received zinc supplements	

LIMITATIONS

Data availability

Not all indicators are available for each country for each year. While the data for some indicators are updated annually, as with the WUENIC immunization coverage, other data sources may only be updated once every few years when new national surveys are published. In cases where a country has no available data for a particular indicator, that indicator is recorded as either "missing" or "0% coverage," depending on the indicator.

While actual changes in the availability and provision of these key interventions may have occurred in a given year, estimates reflecting these changes may not yet be recorded or available. In the event that new data are not collected, the last reported data point within the last 10 years is used for calculations. Thus, GAPPD scores for countries where more data are available may better reflect trends toward GAPPD targets. This limitation underscores the importance of regularly collected, high-quality data that enables accurate monitoring of key GAPPD interventions.

Antibiotics

Concerns have been raised about the validity of antibiotics for suspected pneumonia as an indicator and recommend excluding this indicator in analyses of pneumonia treatment coverage.

Learn more: **"A prospective validation study in South-West Nigeria on caregiver report of childhood pneumonia and antibiotic treatment using Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS) questions"**

Oxygen

The availability of oxygen is not currently a standard health system indicator, despite oxygen's classification as an essential medicine by the WHO. Indicators for tracking country-level progress for oxygen coverage have not been included this year but may be incorporated in the future.

Read more here: **The Every Breath Counts Coalition Indicators Working Group describe the challenges of estimating real-world oxygen access in health facilities.**

CONCLUSIONS & RECOMMENDATIONS

As impacts of the COVID-19 pandemic continue to be felt across the globe, careful consideration is needed to ensure efforts to reduce child mortality due to pneumonia and diarrhea remain a priority.

Investments in these proven interventions to prevent, protect, and treat have dramatically reduced child mortality, but with over 1 million young children still dying of pneumonia and diarrhea every year, we cannot allow this progress to stall or backslide.

Deaths due to pneumonia and diarrhea among young children continue to be disproportionally concentrated in a subset of countries. We must continue to work in partnership with key stakeholders in these vulnerable settings to advance country-level and regional progress to reduce this unacceptably high burden of preventable child mortality.

The COVID-19 pandemic has highlighted health inequities that exist, threatens to widen existing gaps, and placed the most vulnerable children at even greater risk. We must commit greater levels of funding, secure strong political commitment, foster transparency and accountability, and ensure that the coordinated global effort prioritizes equity.

EQUITY: TARGETING THE PLACES OF GREATEST NEED

The global burden of childhood pneumonia and diarrhea is a symptom of a broader problem. Health systems in low-resource settings are falling woefully short of ensuring sufficient access to prevention and treatment for the most vulnerable members. **We need to prioritize reaching those underserved populations** by first identifying the risk factors, understanding the determinants of inequity, and then developing evidence-based strategies to target those factors.

DATA: MONITORING GAPS AND GAINS

Collecting high-quality data is needed to accurately monitor and assess progress. To address equity, efforts must include key indicators to understand subnational differences. **Committed efforts will be needed to explore important subnational disparities** so that approaches can be efficiently tailored to reach communities which are suffering the most due to prevailing health inequities.

INTEGRATION: IDENTIFYING MISSED OPPORTUNITIES

To tackle health equity challenges, we need a comprehensive, integrated strategy that considers social determinants of health influenced by factors such as poverty and gender equity and does not shy away from system-level changes to identify missed opportunities and leverage improvements in supply chains and product suitability.

THE ROTA COUNCIL

Rotavirus Disease and Immunization: Series of Briefs

Six rotavirus-focused briefs cover epidemiology and disease burden, available vaccine products, the impact of vaccination, economic costs of rotavirus disease and the value of vaccines, safety, and introduction and coverage status.

EVERY BREATH COUNTS

The Missing Piece: Why the global pandemic is an inflection point for pneumonia control

Utilizing several data sources including the Global Burden of Disease and updated OECD Official Development Assistance, this report makes the case for a total reboot of the way governments and global health agencies invest in pneumonia.

PATH

COVID-19 Oxygen Needs Tracker

An interactive tool to help advocates, decision-makers, and implementers communicate the urgency of investing in access to medical oxygen and related technologies to meet the needs of COVID-19 in low- and middle-income countries (LMICs).

THE ORS/ZINC CO-PACK ALLIANCE (ORSZCA)

Resources Page

Provides resources for those championing co-packaged ORS and zinc, including: The ORS/Zinc Playbook, PATH's Defeat Diarrheal Disease Initiative, and the ColaLife Case for Co-packaging.

VIEW-HUB

Website

VIEW-hub is an online, interactive, map-based platform for visualizing data on vaccine use and impact. Find the most relevant and recent vaccine data, covering topics such as **Vaccine Introduction & Use**, **Immunization Equity**, **Vaccine Preventable Disease Burden**, and **Immunization System Strength**. It also includes country level summary data on the latest academic studies on **Vaccine Impact**, as well as the **Economic Burden of Disease**.

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DHS — Demographic & Health Survey

DRC — Democratic Republic of Congo

DTP — Diphtheria-tetanus-pertussis vaccine

DTP3 — Third dose of diphtheria-tetanus-pertussis (DTP) vaccine

GAPPD — The Integrated Global Action Plan for the Prevention and Control of Pneumonia and Diarrhea

Hib — *Haemophilus influenzae* type B

Hib3 — Third dose of Haemophilus influenzae type b (Hib) vaccine

IVAC — International Vaccine Access Center

MCEE — WHO Maternal and Child Epidemiology Estimation Group

MCV — Measles-containing vaccine

MCV1 — First dose of measles-containing vaccine (MCV)

MICS — Multiple Indicator Cluster Survey

NIP — National Immunization Program

NFHS — National Family Health Survey

ORS — Oral rehydration salts

PCV — Pneumoccocal conjugate vaccine

PCV3 — Third dose of pneumococcal conjugate vaccine (PCV)

RotaC — Rotavirus vaccine final dose

SDG — Sustainable Development Goals

WHO — World Health Organization

WUENIC — WHO/UNICEF Estimates of National Immunization Coverage