

Global Burden of Nutritional Deficiencies among Children Under 5 Years of Age from 2010 to 2019

Figure S1. Change in the number of nutritional deficiencies in children under 5 years of age in 2019 compared to 2010. (A) Change in incidence cases of nutritional deficiencies in children under 5 years of age compared to 2010; (B) Change in DALYS cases of nutritional deficiencies in children under 5 years of age compared to 2010. (IR: Incidence rate; DR: DALYs rate; EAPC: Estimate annual percentage change; C.A.R.: Central African Republic; Dem. Rep. of Congo: Democratic Republic of the Congo; B. Faso: Burkina Faso; Syr.: Syrian Arab Republic)

Figure S2. Global burden of nutritional deficiencies in children under 5 years of age. (a) EPAC of the incidence rate of global nutritional deficiencies in children under 5 years of age from 2010 to 2019. (b) EPAC of the DALYs rate of global nutritional deficiencies in children under 5 years of age from 2010 to 2019. (IR: Incidence rate; DR: DALYs rate; EAPC: Estimate annual percentage change)

Figure S3. Contribution of dietary iron deficiency, iodine deficiency, vitamin A deficiency, protein-energy malnutrition and other cause to nutritional deficiency cases and DALYs, globally and by region, in 2010 and 2019.

Figure S4. Cluster of countries and territories with similar EAPC of incidence and DALY rate of nutritional deficiencies in children under 5 years of age.

Figure S5. Cluster of countries and territories with similar incidence and DALY rate of nutritional deficiencies in children under 5 years of age in 2019.

Figure S6. Cluster of countries and territories with similar incidence and DALY rate of nutritional deficiencies in children under 5 years of age in 2010.

Table S1. Incidence and temporal trend of 5 nutritional deficiencies subcategories among children under 5 years of age in 5 SDI regions and 21 GBD regions from 2010 to 2019

Table S2. DALY rate and temporal trend of 5 nutritional deficiencies subcategories among children under 5 years of age in 5 SDI regions and 21 GBD regions from 2010 to 2019

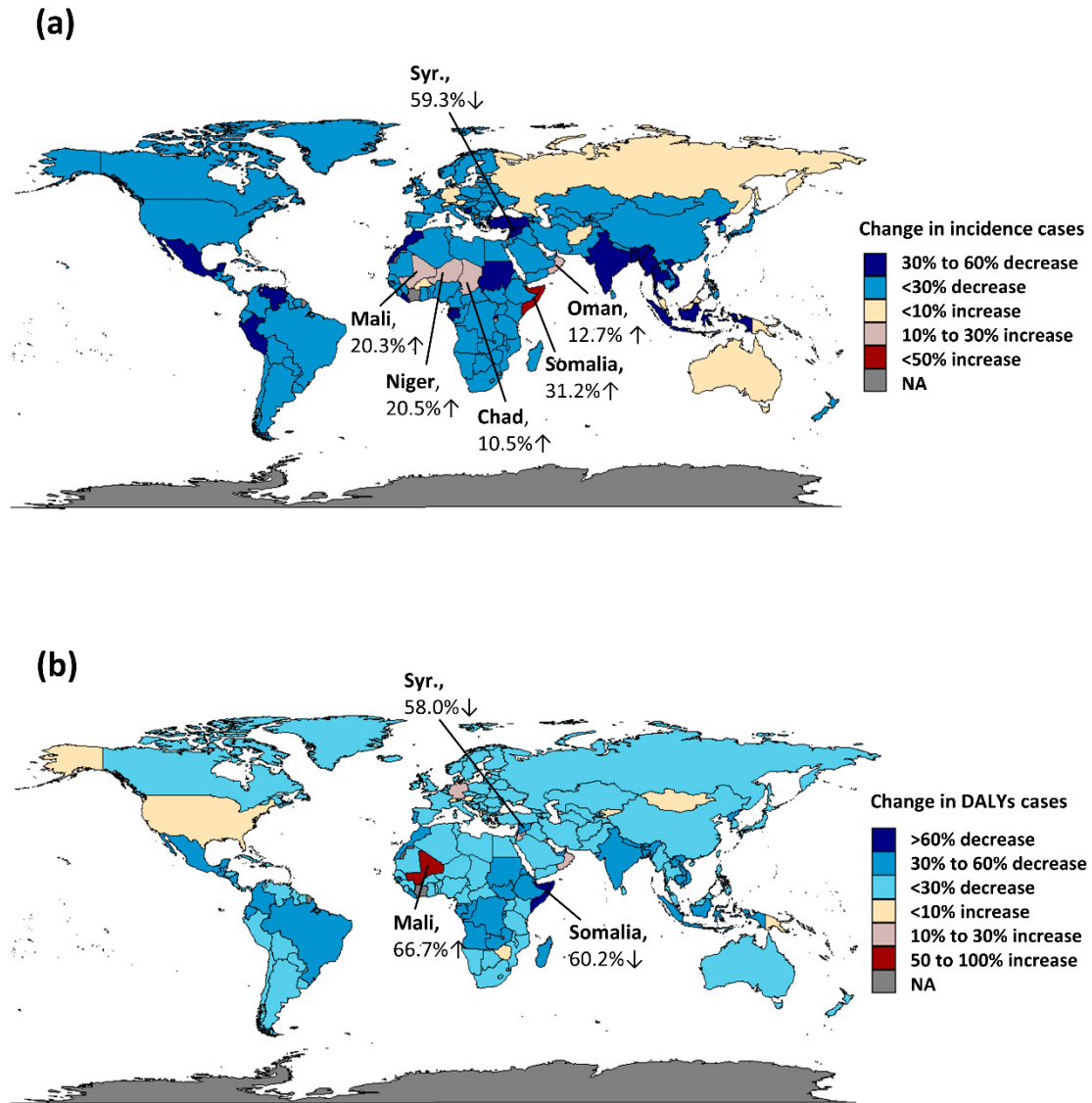


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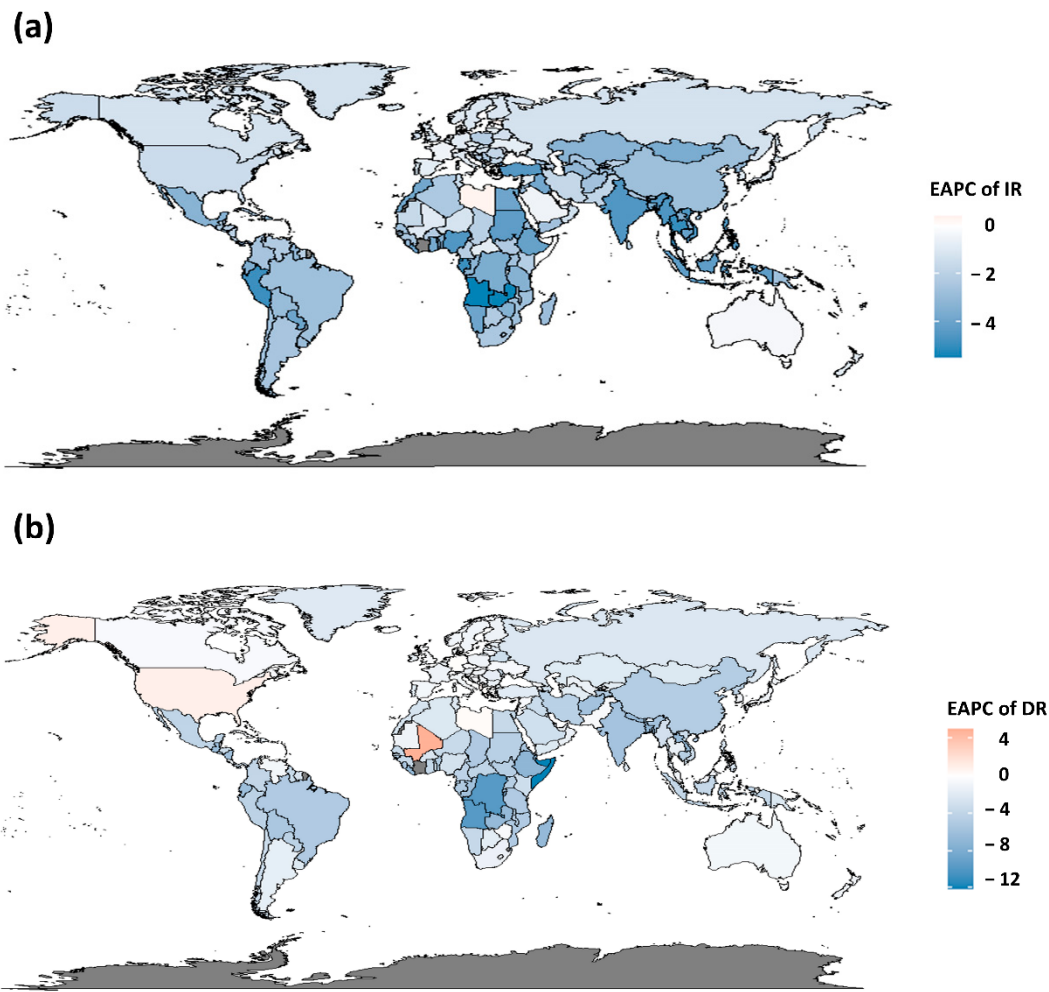


Figure S2. Global burden of nutritional deficiencies in children under 5 years of age. (a) EAPC of the incidence rate of global nutritional deficiencies in children under 5 years of age from 2010 to 2019. (b) EAPC of the DALYs rate of global nutritional deficiencies in children under 5 years of age from 2010 to 2019. (IR: Incidence rate; DR: DALYS rate; EAPC: Estimate annual percentage change)

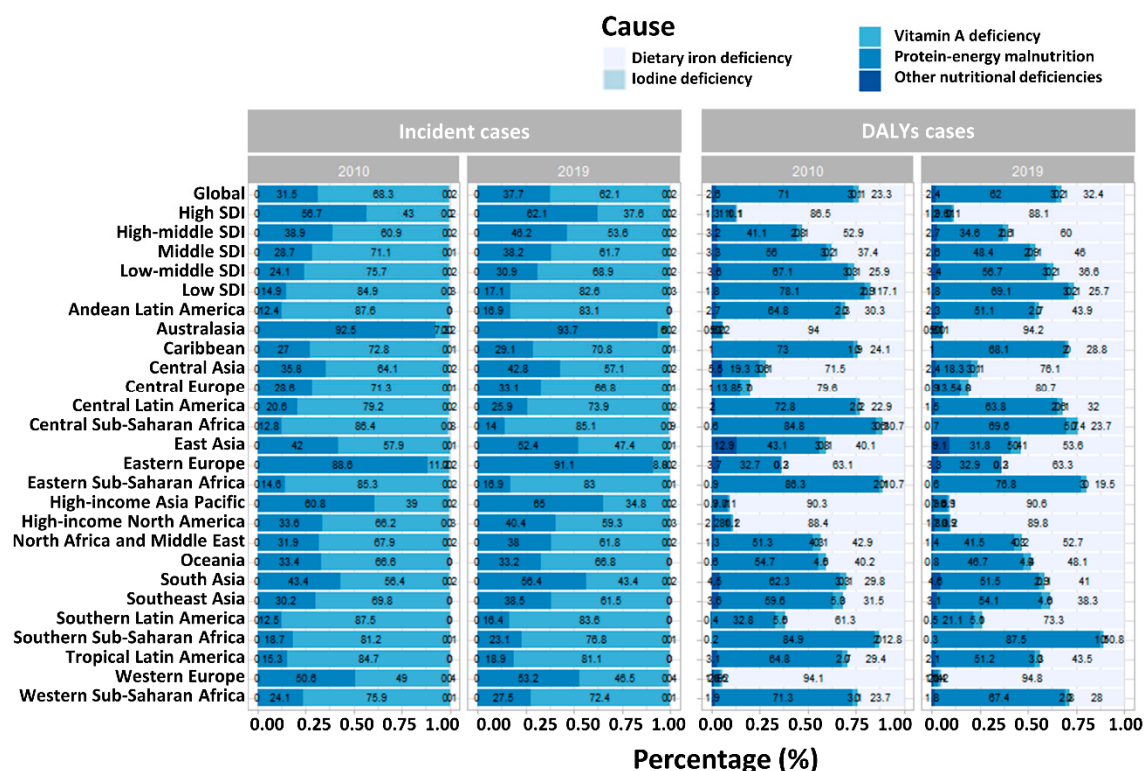


Figure S3. Contribution of dietary iron deficiency, iodine deficiency, vitamin A deficiency, protein-energy malnutrition and other cause to nutritional deficiency cases and DALYs, globally and by region, in 2010 and 2019.

Table S1. Incidence and temporal trend of 5 nutritional deficiencies subcategories among children under 5 years of age in 5 SDI regions and 21 GBD regions from 2010 to 2019.

Region	Vitamin A deficiency		Iodine deficiency		Dietary iron deficiency		Protein-energy malnutrition		Other	
	2019	2010 - 2019	2019	2010 - 2019	2019	2010-2019	2019	2010-2019	2019	2010-2019
	IR/10 ⁵	EAPC (%) (95%UI)	IR/10 ⁵	EAPC (%) (95%UI)	IR/10 ⁵	EAPC (%) (95%UI)	IR/10 ⁵	EAPC (%)	IR/10 ⁵	EAPC (%) (95%UI)
Global	15,163.8	-4.4 (-4.6 to -4.1)	47.2	-3.1 (-3.5 to -2.6)	0	0 (0 to 0)	9206.3	-1.7 (-2.4 to -1)	0	0 (0 to 0)
High-middle SDI	4201.8	-4.3 (-4.4 to -4.2)	16.6	-1.3 (-1.7 to -1)	0	0 (0 to 0)	3617.9	-1.8 (-2.5 to -1)	0	0 (0 to 0)
High SDI	1305.0	-2.3 (-2.4 to -2.2)	8.4	-0.3 (-0.3 to -0.2)	0	0 (0 to 0)	2153.2	-0.2 (-0.6 to 0.3)	0	0 (0 to 0)
Low-middle SDI	16,307.4	-5.7 (-6.0 to -5.4)	51.1	-2.8 (-3.4 to -2.2)	0	0 (0 to 0)	7310.5	-2.8 (-3.9 to -1.7)	0	0 (0 to 0)
Low SDI	31,257.5	-3.6 (-3.7 to -3.4)	97.1	-4.2 (-4.6 to -3.7)	0	0 (0 to 0)	6483.7	-2.1 (-2.7 to -1.5)	0	0 (0 to 0)
Middle SDI	8026.2	-5.9 (-6.1 to -5.7)	22.1	-1.8 (-2.3 to -1.4)	0	0 (0 to 0)	4967.4	-2.1 (-3.2 to -1.1)	0	0 (0 to 0)
Andean Latin America	7676.7	-4.3 (-4.6 to -3.9)	2.1	-0.9 (-1.0 to -0.8)	0	0 (0 to 0)	1560.9	-1.3 (-2.4 to -0.1)	0	0 (0 to 0)
Australasia	150.7	-2.7 (-3.0 to -2.4)	6.0	-0.3 (-0.3 to -0.2)	0	0 (0 to 0)	2349.7	-0.4 (-0.5 to -0.2)	0	0 (0 to 0)
Caribbean	10,557.2	-1.8 (-2.0 to -1.6)	21.7	-0.4 (-0.7 to -0.2)	0	0 (0 to 0)	4335.7	-1.1 (-2.3 to 0.1)	0	0 (0 to 0)
Central Asia	7153.3	-3.7 (-3.9 to -3.6)	20.1	-2.2 (-2.6 to -1.9)	0	0 (0 to 0)	5365.2	-0.8 (-1.5 to -0.1)	0	0 (0 to 0)
Central Europe	9487.9	-2.6 (-2.6 to -2.5)	8.7	-1.0 (-1.1 to -0.8)	0	0 (0 to 0)	4706.6	-0.3 (-0.7 to 0.2)	0	0 (0 to 0)
Central Latin America	8847.9	-3.7 (-3.8 to -3.5)	28.0	0.1 (0 to 0.1)	0	0 (0 to 0)	3094.7	-1.0 (-2.3 to 0.2)	0	0 (0 to 0)
Central Sub-Saharan Africa	44,156.8	-4.0 (-4.2 to -3.8)	455.6	-3.3 (-3.7 to -3)	0	0 (0 to 0)	7259.6	-3.0 (-3.7 to -2.2)	0	0 (0 to 0)
East Asia	4095.9	-4.6 (-5.1 to -4.2)	11.4	0.7 (0.5 to 1)	0	0 (0 to 0)	4528.2	-1 (-1.8 to -0.2)	0	0 (0 to 0)
Eastern Europe	541.8	-3.3 (-3.5 to -3.2)	10.8	-0.6 (-0.9 to -0.3)	0	0 (0 to 0)	5632.8	-0.9 (-1.4 to -0.3)	0	0 (0 to 0)
Eastern Sub-Saharan Africa	34,384.4	-3.1 (-3.2 to -3.1)	57.6	-6.8 (-7.5 to -6)	0	0 (0 to 0)	6981.1	-1.3 (-1.8 to -0.9)	0	0 (0 to 0)
High-income Asia Pacific	1525.1	-2.1 (-2.2 to -2.1)	7.4	-0.3 (-0.5 to -0.2)	0	0 (0 to 0)	2845.9	-0.4 (-0.9 to 0.1)	0	0 (0 to 0)

High-income America	North	1280.7	-2.5 (-2.7 to -2.2)	6.6	-0.1 (-0.2 to 0.1)	0	0 (0 to 0)	873.3	0.4 (0 to 0.8)	0	0 (0 to 0)
North Africa and Middle East		12,635.8	-3.5 (-3.8 to -3.1)	42.7	-0.9 (-1.6 to -0.1)	0	0 (0 to 0)	7775.2	-0.8 (-1.4 to -0.1)	0	0 (0 to 0)
Oceania		20,762.6	-2.4 (-2.5 to -2.3)	1.4	-2.9 (-3.5 to -2.3)	0	0 (0 to 0)	10,306.1	-2.8 (-4 to -1.6)	0	0 (0 to 0)
South Asia		14,138.7	-6.9 (-7.3 to -6.5)	64.2	-3.2 (-4 to -2.5)	0	0 (0 to 0)	18,345.5	-1.6 (-2.2 to -0.9)	0	0 (0 to 0)
Southeast Asia		15,573.4	-5.3 (-5.6 to -5.1)	5.5	-3 (-3.4 to -2.5)	0	0 (0 to 0)	9735.6	-1.8 (-3 to -0.6)	0	0 (0 to 0)
Southern America	Latin	10,539.4	-3.0 (-3.1 to -2.9)	5.5	-0.4 (-0.6 to -0.2)	0	0 (0 to 0)	2062.7	0.1 (-0.6 to 0.9)	0	0 (0 to 0)
Southern Africa	Sub-Saharan	17,324.9	-3.4 (-3.6 to -3.2)	26.6	-0.5 (-0.6 to -0.4)	0	0 (0 to 0)	5201.6	-0.6 (-1.5 to 0.3)	0	0 (0 to 0)
Tropical America	Latin	11,612.4	-3.1 (-3.3 to -2.8)	3.1	-0.1 (-0.2 to 0.1)	0	0 (0 to 0)	2708.7	-1.1 (-2.9 to 0.6)	0	0 (0 to 0)
Western Europe		1836.2	-1.4 (-1.4 to -1.3)	14.7	-0.7 (-0.7 to -0.6)	0	0 (0 to 0)	2100.5	-0.4 (-0.9 to 0)	0	0 (0 to 0)
Western Africa	Sub-Saharan	24,101.8	-3 (-3.2 to -2.8)	26.2	-1.0 (-1.1 to -1)	0	0 (0 to 0)	9163.8	-1.3 (-1.9 to -0.7)	0	0 (0 to 0)

Table S2. DALY rate and temporal trend of 5 nutritional deficiencies subcategories among children under 5 years of age in 5 SDI regions and 21 GBD regions from 2010 to 2019.

Region	Vitamin A deficiency		Iodine deficiency		Dietary iron deficiency		Protein-energy malnutrition		Other nutritional deficiencies	
	2019	2010 - 2019	2019	2010 - 2019	2019	2010-2019	2019	2010-2019	2019	2010-2019
	DR/10 ⁵	EAPC (%) (95%UI)	DR/10 ⁵	EAPC (%) (95%UI)	DR/10 ⁵	EAPC (%) (95%UI)	DR/10 ⁵	EAPC (%) (95%UI)	DR/10 ⁵	EAPC (%) (95%UI)
Global	76.3	-4.1 (-4.4 to -3.8)	1.8	-5.4 (-6.4 to -4.4)	781.5	-0.7 (-0.7 to -0.7)	1497.4	-5.6 (-5.8 to -5.4)	57.5	-5 (-5.3 to -4.7)
Low SDI	173.2	-3.6 (-3.8 to -3.4)	4.0	-5.8 (-6.8 to -4.9)	1377.9	-0.2 (-0.2 to -0.1)	3703.0	-5.6 (-6.1 to -5)	99.0	-4.2 (-4.7 to -3.7)
Low-middle SDI	82.2	-5.6 (-5.9 to -5.3)	2.1	-5.8 (-6.6 to -4.9)	939.0	-1.2 (-1.3 to -1.2)	1456.2	-6.9 (-7.2 to -6.6)	86.5	-5.6 (-5.9 to -5.2)
Middle SDI	30.1	-5.2 (-5.6 to -4.8)	0.6	-5.6 (-7.1 to -4.1)	478.4	-1.6 (-1.7 to -1.5)	502.4	-5.6 (-6.1 to -5.2)	27.4	-6.4 (-6.7 to -6.1)
High-middle SDI	14.0	-3.7 (-4.1 to -3.4)	0.4	-1.5 (-1.8 to -1.2)	317.2	-1.7 (-1.7 to -1.6)	183.0	-5.0 (-5.4 to -4.7)	14.3	-4.7 (-5.1 to -4.2)
High SDI	1.3	-2.2 (-2.3 to -2.1)	0.2	-0.3 (-0.4 to -0.2)	116.8	-0.8 (-0.8 to -0.7)	12.7	-2.4 (-2.6 to -2.2)	1.6	-1.6 (-1.9 to -1.2)
Andean Latin America	31.7	-3.3 (-3.5 to -3.0)	0.01	-0.8 (-0.9 to -0.7)	514.2	-1 (-1.1 to -0.9)	598.4	-7.1 (-7.8 to -6.4)	27.3	-6.0 (-6.8 to -5.2)
Australasia	0.3	-3.6 (-4 to -3.2)	0.1	0.2 (0 to 0.3)	213.3	-0.9 (-1 to -0.7)	11.4	-1 (-1.2 to -0.7)	1.3	-1.6 (-2.0 to -1.2)
Caribbean	56.0	-0.8 (-1.1 to -0.5)	0.8	-0.6 (-0.8 to -0.3)	791.6	0.4 (0.3 to 0.6)	1871.9	-2.5 (-2.8 to -2.1)	26.8	-2.3 (-2.9 to -1.7)
Central Asia	30.5	-3.5 (-3.7 to -3.4)	0.6	-2.8 (-3.3 to -2.3)	739.0	-1.3 (-1.3 to -1.3)	177.4	-2.6 (-2.8 to -2.3)	23.5	-11.2 (-13.1 to -9.2)
Central Europe	18.9	-3.0 (-3.1 to -2.9)	0.2	-1.0 (-1.2 to -0.9)	320.4	-1.0 (-1.1 to -0.9)	53.7	-1.2 (-1.5 to -1)	3.8	-1.3 (-2.0 to -0.6)
Central Latin America	25.7	-2.3 (-2.4 to -2.2)	0.7	4.8 (3.4 to 6.3)	313.9	-0.2 (-0.4 to -0.1)	625.7	-5.4 (-5.9 to -4.9)	14.7	-7.3 (-7.7 to -6.9)
Central Sub-Saharan Africa	225.4	-4.4 (-4.7 to -4.2)	15.7	-5.8 (-6.9 to -4.6)	938.8	-0.6 (-0.8 to -0.3)	2759.0	-11.2 (-11.8 to -10.5)	27.0	-7.3 (-7.7 to -7)
East Asia	12.6	-1.9 (-2.6 to -1.3)	0.2	0.7 (0.4 to 1)	125.7	-1.8 (-2.1 to -1.5)	74.6	-7.8 (-8.4 to -7.3)	21.4	-8.3 (-8.9 to -7.8)
Eastern Europe	0.6	-4.7 (-5 to -4.4)	0.4	-0.6 (-0.9 to -0.3)	149.1	-2.0 (-2.2 to -1.9)	77.5	-2.1 (-2.4 to -1.7)	7.8	-3.2 (-3.4 to -2.9)
Eastern Sub-Saharan Africa	168.8	-3.1 (-3.2 to -3.0)	2.4	-8.0 (-9.1 to -6.9)	1092.1	-0.3 (-0.4 to -0.3)	4289.1	-7.9 (-8.7 to -7.1)	35.6	-9.3 (-11.9 to -6.7)

High-income Asia Pacific	1.7	-2.9 (-3.0 to -2.8)	0.1	-0.3 (-0.5 to -0.1)	178.8	-0.9 (-1 to -0.8)	14.9	-1.2 (-1.2 to -1.2)	1.8	-1.3 (-1.5 to -1.1)
High-income North America	0.6	-1.8 (-2 to -1.6)	0.1	-0.1 (-0.3 to 0.1)	59.1	1.0 (0.9 to 1.1)	4.8	0.2 (-0.5 to 0.8)	1.2	-0.9 (-1.2 to -0.7)
North Africa and Middle East	54.1	-3.6 (-4 to -3.3)	2.1	-1.0 (-2.0 to 0)	666.5	-1.0 (-1.2 to -0.9)	524.7	-5.5 (-5.7 to -5.3)	17.6	-2.7 (-3.2 to -2.2)
Oceania	89.7	-2.4 (-2.5 to -2.3)	0.1	-5.3 (-6.3 to -4.3)	973.3	-0.3 (-0.4 to -0.2)	946.5	-3.9 (-4.4 to -3.4)	15.4	0.3 (0.1 to 0.5)
South Asia	84.0	-6.3 (-6.7 to -5.9)	2.9	-6.2 (-7.3 to -5.1)	1197.9	-1.1 (-1.1 to -1.1)	1504.5	-6.8 (-7.2 to -6.4)	133.1	-4.4 (-4.9 to -3.9)
Southeast Asia	50.8	-4.9 (-5.3 to -4.6)	0.2	4.3 (1.9 to 6.8)	426	-1.1 (-1.3 to -0.9)	601.5	-4.2 (-4.4 to -4)	34.3	-4.9 (-5 to -4.8)
Southern Latin America	27.2	-2.6 (-2.7 to -2.4)	0.1	-0.5 (-0.8 to -0.2)	390.7	0.3 (0.2 to 0.4)	112.2	-6.5 (-8.2 to -4.8)	2.5	-0.5 (-0.8 to -0.2)
Southern Sub-Saharan Africa	59.7	-4.4 (-4.8 to -4.1)	0.5	-0.9 (-1 to -0.8)	441.1	-2.5 (-2.8 to -2.2)	3576.7	-0.7 (-1.8 to 0.4)	11.2	0.4 (-0.2 to 1)
Tropical Latin America	35.3	-2.7 (-2.9 to -2.5)	0.1	0 (-0.2 to 0.1)	468.5	-0.6 (-0.6 to -0.6)	551.7	-7.7 (-8.8 to -6.6)	22.7	-8.6 (-10 to -7.1)
Western Europe	1.6	-2 (-2.2 to -1.9)	0.3	-0.7 (-0.8 to -0.6)	106.8	-0.8 (-0.9 to -0.7)	2.7	-2.5 (-2.9 to -2.1)	1.3	-1.7 (-2.1 to -1.3)
Western Sub-Saharan Africa	157.0	-2.9 (-3.1 to -2.6)	0.8	-2.9 (-3.5 to -2.3)	1567	0.2 (0.1 to 0.3)	3773.4	-1.3 (-2.3 to -0.4)	99.0	-2.1 (-2.7 to -1.5)