

## Disease burden and risk factors of children aged 0-14 years in China: a retrospective study on data from the Global Burden of Disease Study 2019

### 1 Supplementary table 1 Ranking of constituent ratio of deaths for children aged < 5 years from 1990 to 2019

1990 rank		2019 rank	
Disease/Injury and rank	Death,% (95%UI)	Disease/Injury and rank	Death,% (95%UI)
1 Respiratory infections and tuberculosis	31.12 (27.36 to 34.13)	1 Neonatal disorders	34.39 (32.22 to 35.87)
2 Neonatal disorders	21.47 (20.66 to 22.17)	2 Congenital birth defects	23.67 (21.31 to 27.87)
3 Congenital birth defects	12.29 (9.83 to 16.91)	3 Unintentional injuries	12.27 (10.69 to 13.12)
4 Unintentional injuries	9.62 (8.59 to 10.46)	4 Respiratory infections and tuberculosis	11.66 (10.26 to 12.83)
5 Other infectious diseases	8.37 (5.78 to 12.65)	5 Neoplasms	3.76 (3.22 to 4.55)
6 Enteric infections	5.78 (4.91 to 6.67)	6 Other infectious diseases	3.57 (2.89 to 4.63)
7 Nutritional deficiencies	2.19 (1.86 to 2.56)	7 Transport injuries	3.18 (2.69 to 3.52)
8 Transport injuries	1.94 (1.60 to 2.48)	8 HIV/AIDS and sexually transmitted infections	1.81 (0.85 to 3.43)
9 Neoplasms	1.88 (1.43 to 2.31)	9 Digestive diseases	1.31 (1.08 to 1.62)
10 Digestive diseases	1.33 (1.09 to 1.57)	10 Cardiovascular diseases	1.23 (1.10 to 1.42)
11 Cardiovascular diseases	1.31 (1.13 to 1.47)	11 Enteric infections	1.21 (0.97 to 1.47)
12 Self-harm and interpersonal violence	0.47 (0.40 to 0.55)	12 Neurological disorders	0.61 (0.53 to 0.73)
13 Neurological disorders	0.38 (0.30 to 0.46)	13 Nutritional deficiencies	0.48 (0.40 to 0.55)
14 HIV/AIDS and sexually transmitted infections	0.35 (0.13 to 0.73)	14 Self-harm and interpersonal violence	0.40 (0.33 to 0.47)
15 Diabetes and kidney diseases	0.26 (0.23 to 0.29)	15 Diabetes and kidney diseases	0.24 (0.21 to 0.27)
16 Chronic respiratory diseases	0.15 (0.10 to 0.18)	16 Chronic respiratory diseases	0.09 (0.07 to 0.11)
17 Neglected tropical diseases and malaria	0.10 (0.05 to 0.30)	17 Neglected tropical diseases and malaria	0.06 (0.03 to 0.08)
18 Skin and subcutaneous diseases	0.08 (0.04 to 0.10)	18 Skin and subcutaneous diseases	0.05 (0.04 to 0.07)
19 Substance use disorders	0.00 (0.00 to 0.00)	19 Substance use disorders	0.00 (0.00 to 0.00)

## 2 Supplementary table 2 Ranking of constituent ratio of DALYs for children aged < 5 years from 1990 to 2019.

1990 rank		2019 rank	
Disease/Injury and rank	DALYs,% (95%UI)	Disease/Injury and rank	DALYs,% (95%UI)
1 Respiratory infections and tuberculosis	30.44 (26.76 to 33.40)	1 Neonatal disorders	31.91 (29.51 to 33.71)
2 Neonatal disorders	21.24 (20.40 to 21.98)	2 Congenital birth defects	22.95 (20.84 to 26.51)
3 Congenital birth defects	12.21 (9.81 to 16.73)	3 Respiratory infections and tuberculosis	10.87 (9.66 to 11.92)
4 Unintentional injuries	9.28 (8.26 to 10.08)	4 Unintentional injuries	10.58 (9.22 to 11.50)
5 Other infectious diseases	8.17 (5.65 to 12.33)	5 Neoplasms	3.29 (2.81 to 4.00)
6 Enteric infections	5.81 (4.96 to 6.67)	6 Other infectious diseases	3.17 (2.57 to 3.99)
7 Nutritional deficiencies	2.66 (2.29 to 3.06)	7 Skin and subcutaneous diseases	3.05 (1.98 to 4.49)
8 Transport injuries	1.86 (1.54 to 2.39)	8 Transport injuries	2.70 (2.29 to 3.03)
9 Neoplasms	1.84 (1.40 to 2.26)	9 Enteric infections	2.08 (1.64 to 2.58)
10 Digestive diseases	1.36 (1.13 to 1.59)	10 Digestive diseases	1.63 (1.36 to 1.95)
11 Cardiovascular diseases	1.28 (1.10 to 1.43)	11 HIV/AIDS and sexually transmitted infections	1.56 (0.73 to 2.98)
12 Skin and subcutaneous diseases	0.54 (0.36 to 0.78)	12 Nutritional deficiencies	1.36 (1.02 to 1.82)
13 Neurological disorders	0.46 (0.37 to 0.55)	13 Cardiovascular diseases	1.11 (0.99 to 1.28)
14 Self-harm and interpersonal violence	0.46 (0.39 to 0.54)	14 Neurological disorders	1.03 (0.78 to 1.37)
15 HIV/AIDS and sexually transmitted infections	0.35 (0.13 to 0.72)	15 Chronic respiratory diseases	0.75 (0.42 to 1.27)
16 Diabetes and kidney diseases	0.26 (0.23 to 0.29)	16 Mental disorders	0.65 (0.44 to 0.90)
17 Chronic respiratory diseases	0.25 (0.18 to 0.34)	17 Sense organ diseases	0.56 (0.37 to 0.79)
18 Neglected tropical diseases and malaria	0.18 (0.12 to 0.38)	18 Self-harm and interpersonal violence	0.36 (0.29 to 0.41)

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19 Mental disorders	0.11 (0.07 to 0.16)	19 Diabetes and kidney diseases	0.24 (0.21 to 0.28)
20 Sense organ diseases	0.09 (0.06 to 0.13)	20 Neglected tropical diseases and malaria	0.16 (0.12 to 0.22)
21 Substance use disorders	0.00 (0.00 to 0.00)	21 Substance use disorders	0.00 (0.00 to 0.00)
22 Musculoskeletal disorders	0.00 (0.00 to 0.00)	22 Musculoskeletal disorders	0.00 (0.00 to 0.00)

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Notes: DALYs, disability-adjusted life-years; UI, Uncertainty intervals

### 3 Supplementary table 3 Ranking of constituent ratio of deaths for children aged 5-14 years from 1990 to 2019

1990 rank		2019 rank	
Disease/Injury and rank	Death,% (95%UI)	Disease/Injury and rank	Death,% (95%UI)
1 Unintentional injuries	36.11 (34.02 to 38.31)	1 Unintentional injuries	35.68 (33.23 to 37.03)
2 Transport injuries	12.91 (11.79 to 16.34)	2 Neoplasms	18.47 (16.84 to 20.18)
3 Neoplasms	11.33 (9.52 to 12.30)	3 Transport injuries	17.06 (15.52 to 18.42)
4 Respiratory infections and tuberculosis	8.87 (6.43 to 9.58)	4 Congenital birth defects	6.91 (6.29 to 8.31)
5 Other infectious diseases	7.31 (5.25 to 10.53)	5 Respiratory infections and tuberculosis	3.49 (3.16 to 4.16)
6 Congenital birth defects	5.19 (4.48 to 5.78)	6 Self-harm and interpersonal violence	3.42 (3.13 to 3.72)
7 Self-harm and interpersonal violence	4.71 (3.92 to 5.09)	7 Cardiovascular diseases	3.08 (2.88 to 3.45)
8 Cardiovascular diseases	3.05 (2.76 to 3.36)	8 Other infectious diseases	2.70 (2.36 to 3.23)
9 Enteric infections	2.09 (1.23 to 3.02)	9 Neurological disorders	2.17 (1.99 to 2.53)
10 Digestive diseases	1.85 (1.69 to 2.00)	10 Diabetes and kidney diseases	1.18 (1.11 to 1.27)
11 Neurological disorders	1.56 (1.34 to 1.70)	11 Digestive diseases	1.08 (0.96 to 1.22)
12 Diabetes and kidney diseases	1.40 (1.28 to 1.52)	12 Enteric infections	1.06 (0.69 to 1.65)
13 Chronic respiratory diseases	0.89 (0.64 to 0.99)	13 HIV/AIDS and sexually transmitted infections	0.57 (0.44 to 0.68)
14 Nutritional deficiencies	0.49 (0.43 to 0.54)	14 Chronic respiratory diseases	0.44 (0.40 to 0.51)
15 Neglected tropical diseases and malaria	0.45 (0.27 to 1.93)	15 Musculoskeletal disorders	0.39 (0.33 to 0.50)
16 Musculoskeletal disorders	0.19 (0.17 to 0.25)	16 Neglected tropical diseases and malaria	0.23 (0.13 to 0.29)
17 Skin and subcutaneous diseases	0.10 (0.05 to 0.12)	17 Nutritional deficiencies	0.19 (0.17 to 0.21)
18 HIV/AIDS and sexually transmitted infections	0.04 (0.02 to 0.06)	18 Skin and subcutaneous diseases	0.06 (0.05 to 0.08)
19 Mental disorders	0.00 (0.00 to 0.00)	20 Mental disorders	0.00 (0.00 to 0.01)
20 Neonatal disorders	0.00 (0.00 to 0.00)	19 Neonatal disorders	0.00 (0.00 to 0.00)
21 Substance use disorders	0.00 (0.00 to 0.00)	21 Substance use disorders	0.00 (0.00 to 0.00)

#### 4 Supplementary table 4 Ranking of constituent ratio of DALYs for children aged 5-14 years from 1990 to 2019

1990 rank		2019 rank	
Disease/Injury and rank	DALYs,% (95%UI)	Disease/Injury and rank	DALYs,% (95%UI)
1 Unintentional injuries	23.15 (20.38 to 26.31)	1 Mental disorders	14.29 (11.11 to 17.83)
2 Transport injuries	8.12 (6.88 to 10.39)	2 Unintentional injuries	13.92 (11.55 to 16.76)
3 Mental disorders	7.69 (5.70 to 10.07)	3 Skin and subcutaneous diseases	13.09 (9.75 to 17.14)
4 Respiratory infections and tuberculosis	7.13 (5.65 to 7.80)	4 Neoplasms	6.81 (5.41 to 8.41)
5 Neoplasms	7.06 (5.76 to 8.09)	5 Transport injuries	6.42 (5.16 to 7.90)
6 Skin and subcutaneous diseases	6.93 (4.99 to 9.35)	6 Neurological disorders	5.95 (2.70 to 10.24)
7 Other infectious diseases	5.07 (3.80 to 7.07)	7 Neonatal disorders	4.94 (3.72 to 6.29)
8 Congenital birth defects	4.40 (3.84 to 5.01)	8 Congenital birth defects	4.28 (3.68 to 4.97)
9 Neurological disorders	3.57 (1.86 to 5.84)	9 Respiratory infections and tuberculosis	3.71 (3.00 to 4.61)
10 Nutritional deficiencies	3.56 (2.62 to 4.66)	10 Chronic respiratory diseases	3.61 (2.48 to 5.30)
11 Self-harm and interpersonal violence	3.10 (2.53 to 3.56)	11 Musculoskeletal disorders	3.59 (2.51 to 5.05)
12 Chronic respiratory diseases	2.43 (1.78 to 3.43)	12 Sense organ diseases	3.53 (2.61 to 4.62)
13 Cardiovascular diseases	2.35 (2.09 to 2.64)	13 Nutritional deficiencies	2.09 (1.53 to 2.84)
14 Musculoskeletal disorders	2.04 (1.40 to 2.95)	14 Cardiovascular diseases	1.93 (1.66 to 2.23)
15 Enteric infections	2.00 (1.44 to 2.61)	15 Enteric infections	1.91 (1.41 to 2.57)
16 Sense organ diseases	1.96 (1.34 to 2.74)	16 Self-harm and interpersonal violence	1.61 (1.27 to 1.99)
17 Neglected tropical diseases and malaria	1.83 (1.23 to 2.91)	17 Other infectious diseases	1.40 (1.20 to 1.66)
18 Digestive diseases	1.78 (1.56 to 2.03)	18 Digestive diseases	1.16 (0.94 to 1.45)

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19 Neonatal disorders	1.10 (0.83 to 1.42)	19 Neglected tropical diseases and malaria	0.70 (0.48 to 0.95)
20 Diabetes and kidney diseases	0.98 (0.86 to 1.11)	20 Diabetes and kidney diseases	0.64 (0.52 to 0.81)
21 Substance use disorders	0.03 (0.02 to 0.05)	21 HIV/AIDS and sexually transmitted infections	0.22 (0.16 to 0.28)
22 HIV/AIDS and sexually transmitted infections	0.03 (0.02 to 0.04)	22 Substance use disorders	0.05 (0.03 to 0.07)

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Notes: DALYs, disability-adjusted life-years; UI, Uncertainty intervals

5 **Supplementary table 5 The main risk factors of deaths for children aged <5 years in 2019**

Risk factors	Deaths (number)	95%UI	
		Lower	Upper
Low birth weight	32015.14	27306.50	37050.59
Short gestation	30142.08	25764.33	35011.36
Child wasting	6407.02	3488.40	8788.80

Notes: UI, Uncertainty intervals

6 **Supplementary table 6 The main risk factors of DALYs for children aged <5 years in 2019**

Risk factors	DALYs (number)	95%UI	
		Lower	Upper
Low birth weight	2929169.42	2516687.62	3373041.83
Short gestation	2762744.73	2369528.31	3188025.98
Child wasting	563831.86	307254.84	773336.52
Ambient particulate matter pollution	387305.85	292355.58	487611.39

Notes: DALYs, disability-adjusted life-years; UI, Uncertainty intervals

7 **Supplementary table 7 The main risk factors of deaths for children aged 5-14 years in 2019**

Risk factors	Deaths (number)	95%UI	
		Lower	Upper
Alcohol use	686.23	405.01	970.66
Kidney dysfunction	282.73	249.40	320.09
Secondhand smoke	206.50	131.08	288.97
Ambient particulate matter pollution	205.55	137.76	289.43
Low temperature	139.16	84.38	197.42

High temperature	114.72	73.65	202.59
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Notes: UI, Uncertainty intervals

**8 Supplementary table 8 The main risk factors of DALYs for children aged 5-14 years in 2019**

Risk factors	DALYs (number)	95%UI	
		Lower	Upper
Short gestation	148033.90	113911.20	186253.10
Low birth weight	148033.90	113911.20	186253.10
Iron deficiency	88432.60	48730.73	146051.50
Bullying victimization	79723.42	31690.94	153956.10
Unsafe water source	75267.48	37097.76	124351.30
Alcohol use	57678.62	34345.31	81828.56
Child underweight	46893.92	25913.21	78494.57
Child wasting	46893.92	25913.21	78494.57
Unsafe sanitation	42637.01	25132.96	67713.29

Notes: DALYs, disability-adjusted life-years; UI, Uncertainty intervals

**9 Supplementary table 9 Detailed disease/injuries and DALYs of other infectious diseases in children aged 5-14 years in 2019**

Level	Disease/Injury	DALYs, number (95% UI)
2	Other infectious diseases	105,943.70 (89,172.32 to 126,794.91)
3	Encephalitis	34,445.09 (28,420.34 to 44,949.25)
3	Meningitis	32,717.80 (28,100.39 to 37,888.96)
3	Other unspecified infectious diseases	13,031.04 (9,564.79 to 17,901.93)
3	Acute hepatitis	11,599.30 (7,567.06 to 16,808.03)
3	Measles	6,548.77 (2,101.37 to 15,254.94)



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3	Whooping cough	3,378.64 (439.78 to 9,894.21)
3	Varicella and herpes zoster	2,849.03 (2,148.13 to 3,802.13)
3	Tetanus	1,210.21 (997.42 to 1,597.90)
3	Diphtheria	163.82 (120.25 to 213.94)

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Notes: DALYs, disability-adjusted life-years; UI, Uncertainty intervals

## 10 Supplementary figure 1

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Search

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**GBD Estimate**  
Cause of death or injury

**Measure**  
Deaths x DALYs x

**Metric**  
Number x Percent x

**Cause**  
HIV/AIDS and sexually transmitted infections x  
Respiratory infections and tuberculosis x Enteric infections x  
Neglected tropical diseases and malaria x +18 more

**Location**  
China x

**Age**  
5-14 years x <5 years x

**Sex**  
Both x

**Annual rate of change**  
2019 x 1990 x

Search

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Search

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**GBD Estimate**  
Risk factor

**Measure**  
Deaths x DALYs x

**Metric**  
Number x Percent x

**Risk**  
Unsafe water source x Unsafe sanitation x  
No access to handwashing facility x Ambient particulate matter pollution x  
+65 more

**Cause**  
HIV/AIDS and sexually transmitted infections x  
Respiratory infections and tuberculosis x Enteric infections x  
Other infectious diseases x +16 more

**Location**  
China x

**Age**  
5-14 years x <5 years x

**Sex**  
Both x

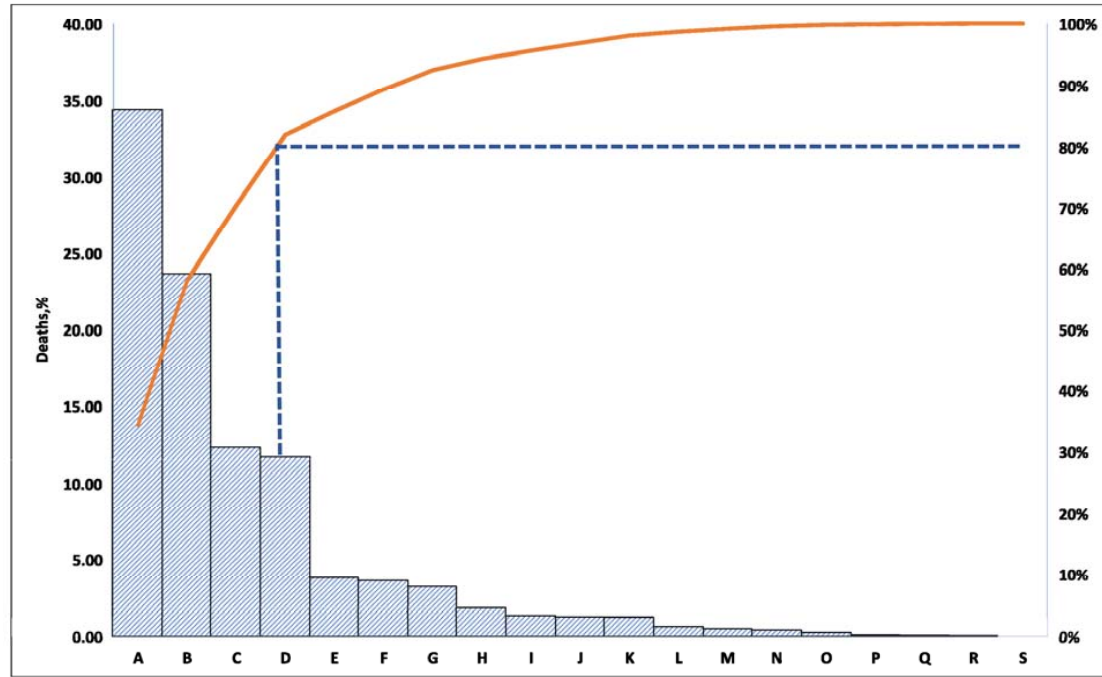
**Annual rate of change**  
2019 x

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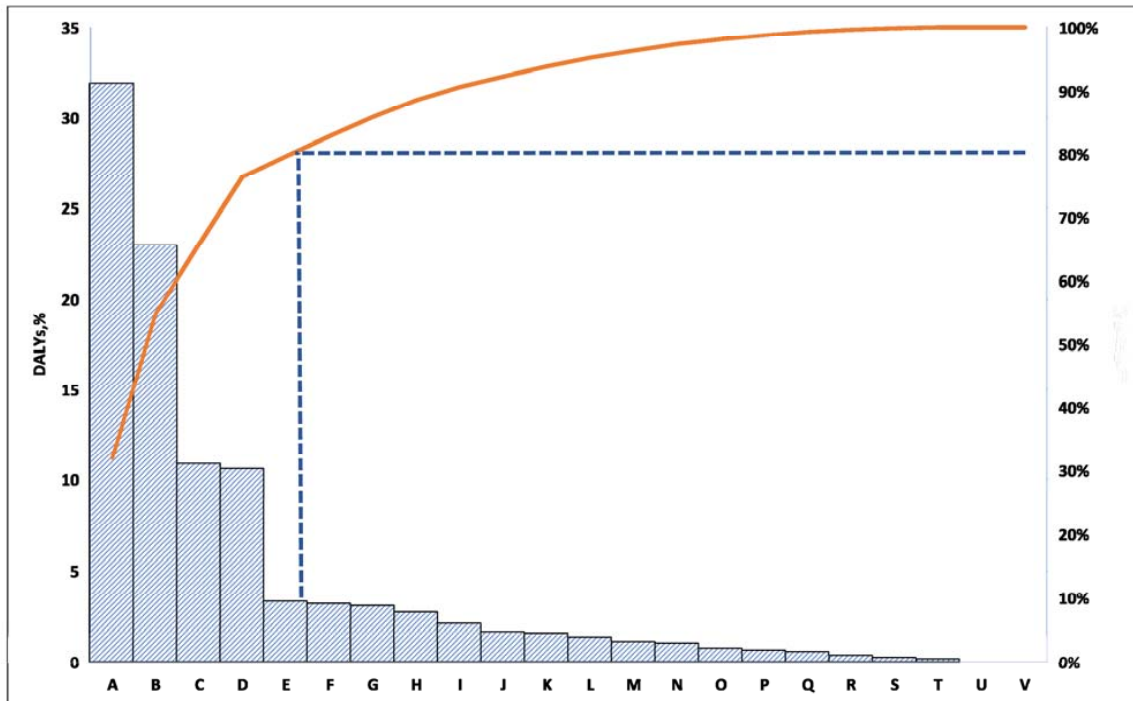
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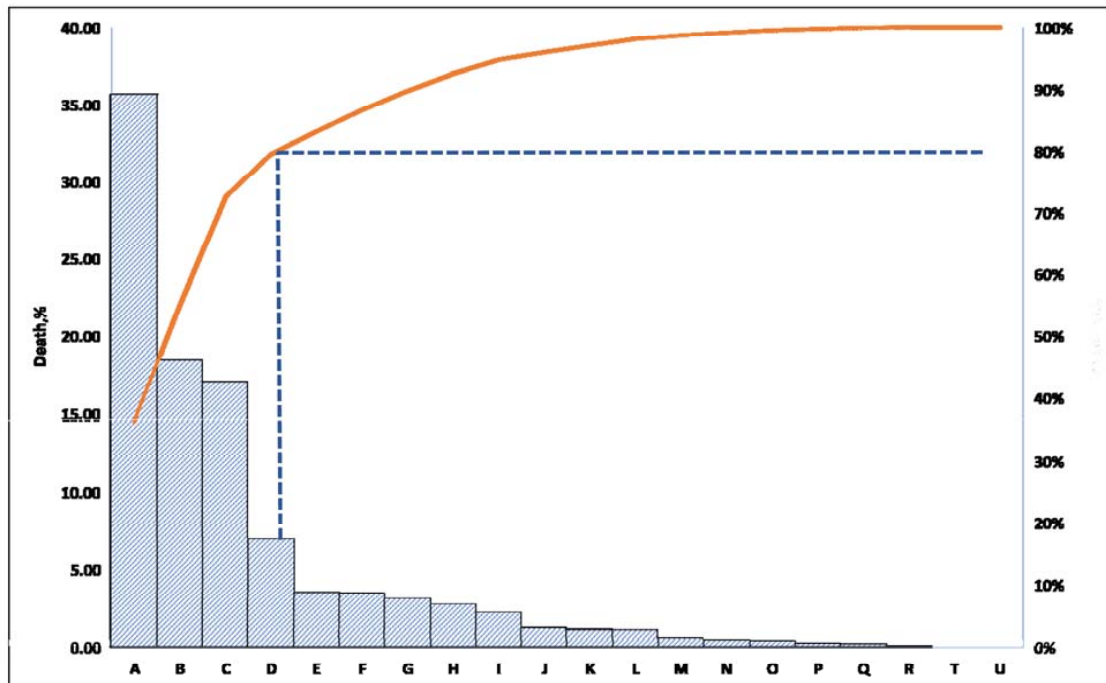
### 11 Supplementary figure 2



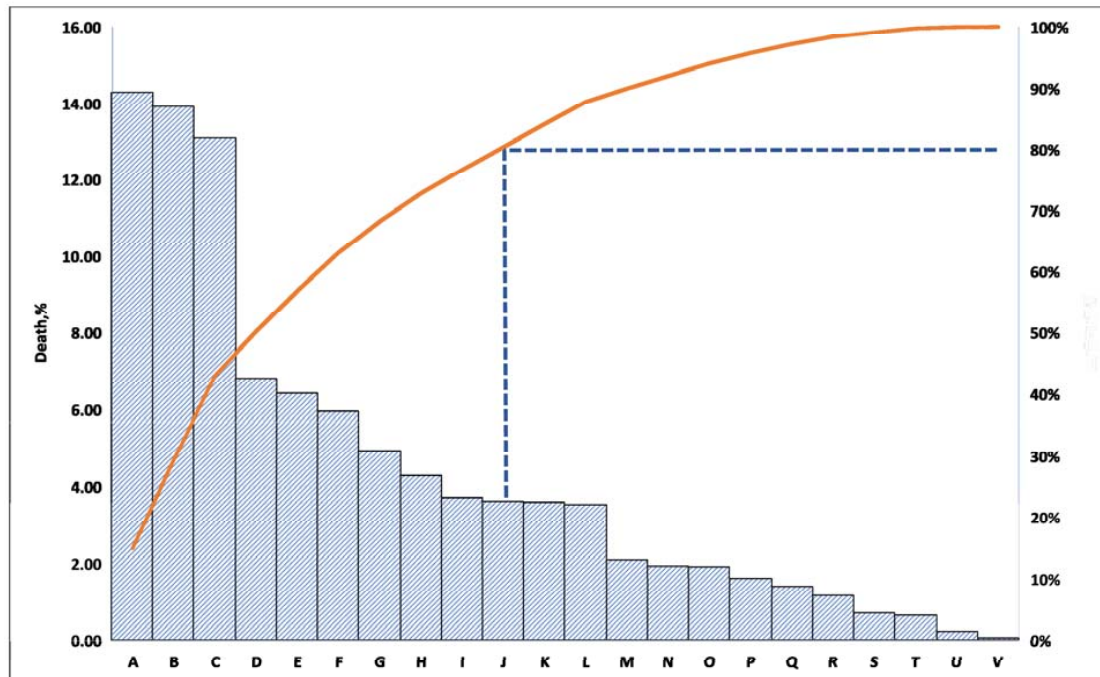
## 12 Supplementary figure 3



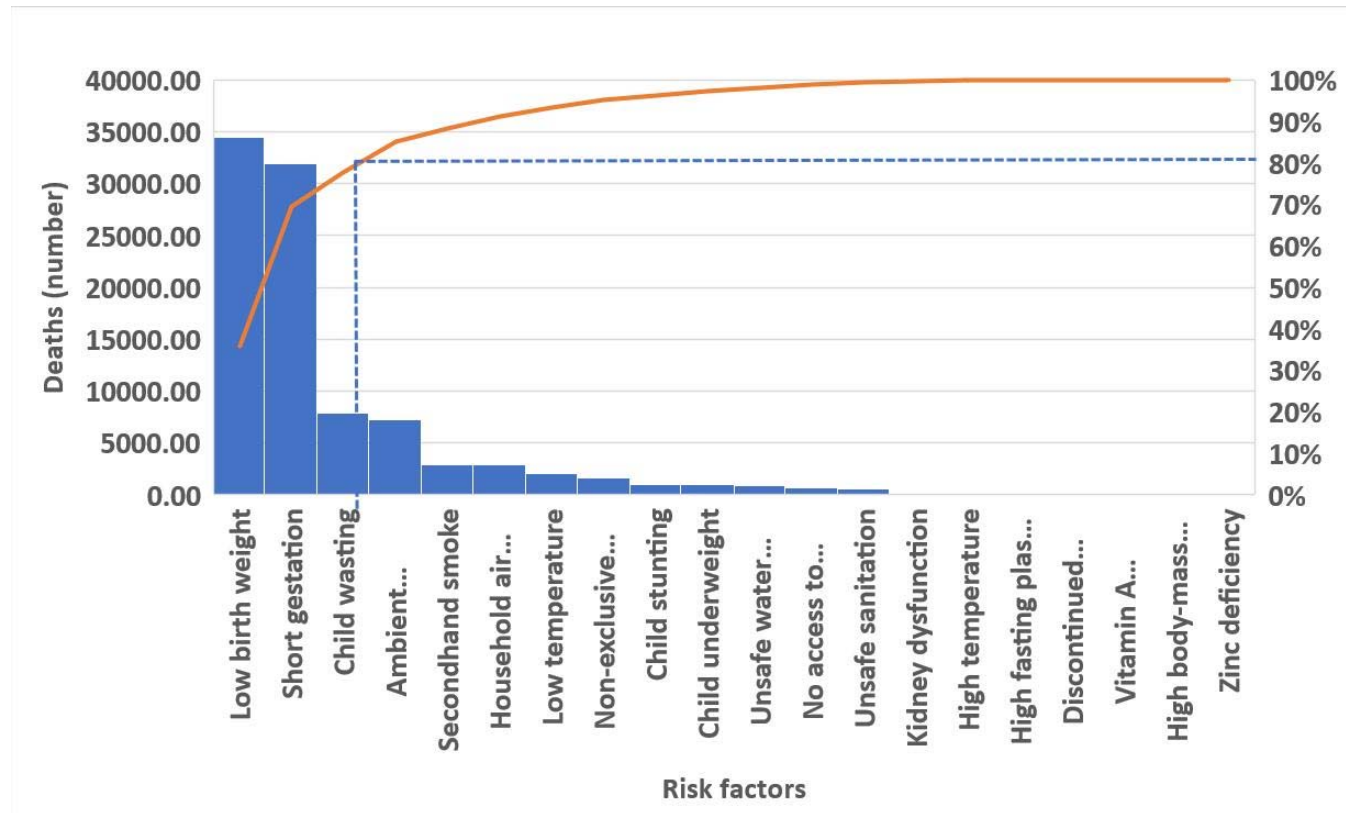
## 13 Supplementary figure 4



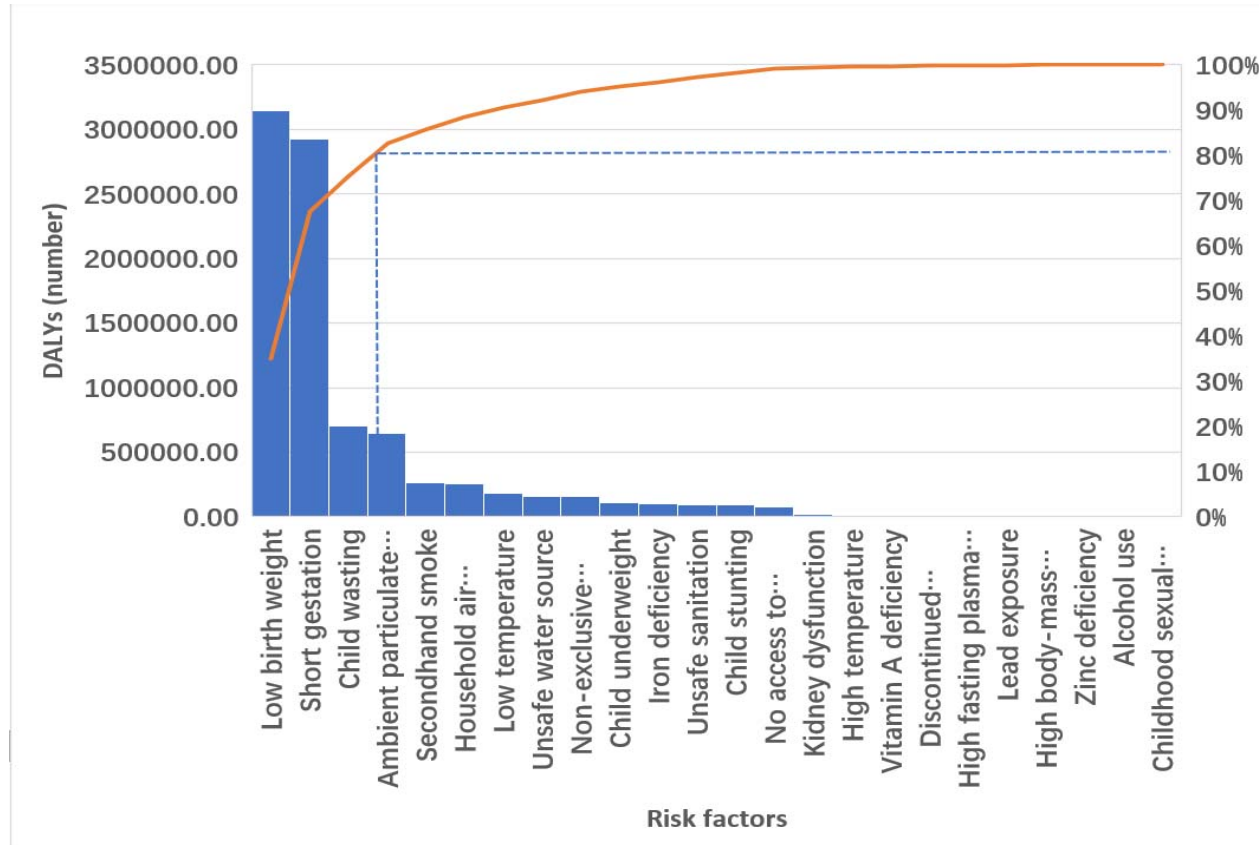
## 14 Supplementary figure 5



## 15 Supplementary figure 6

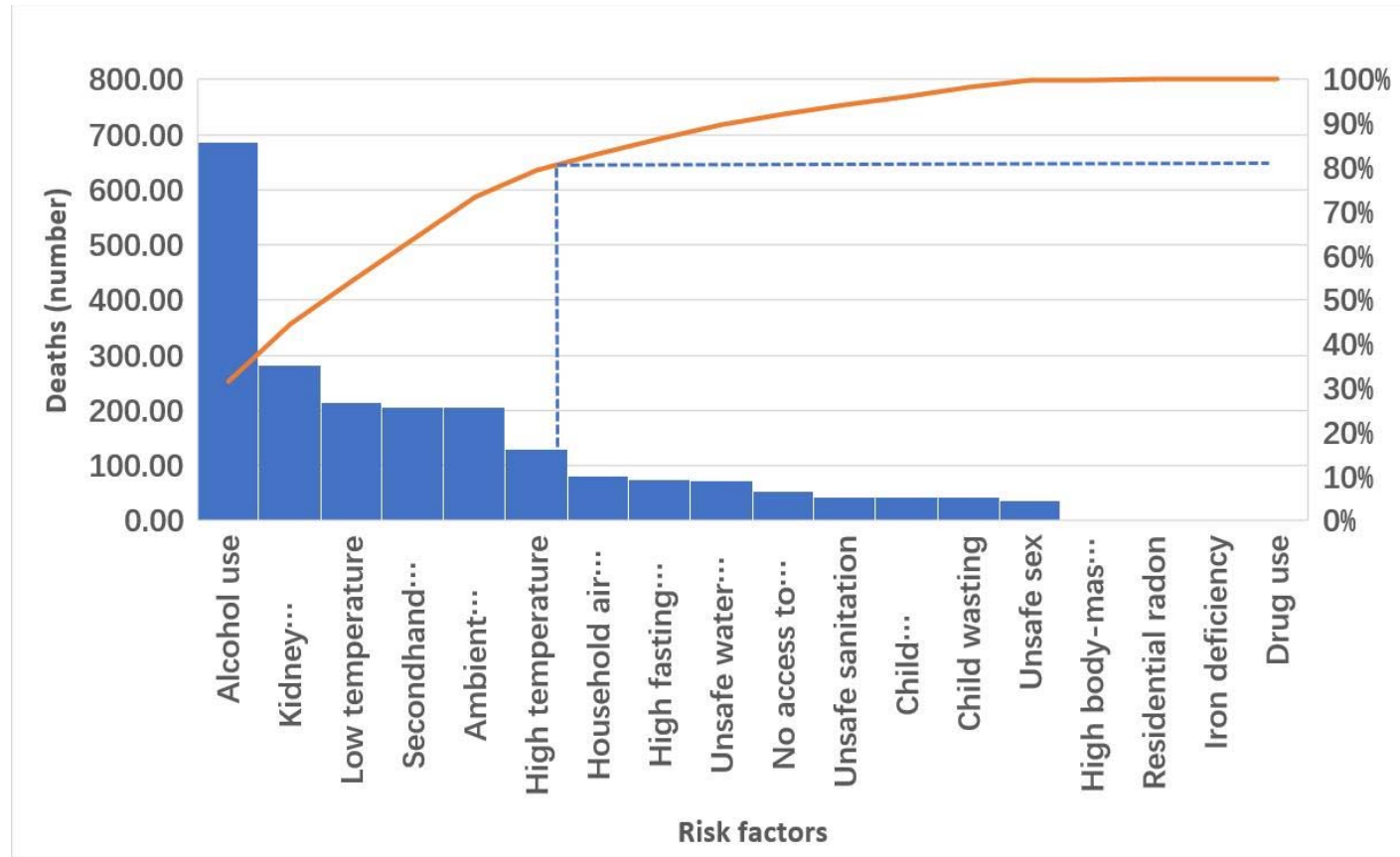


16 Supplementary figure 7

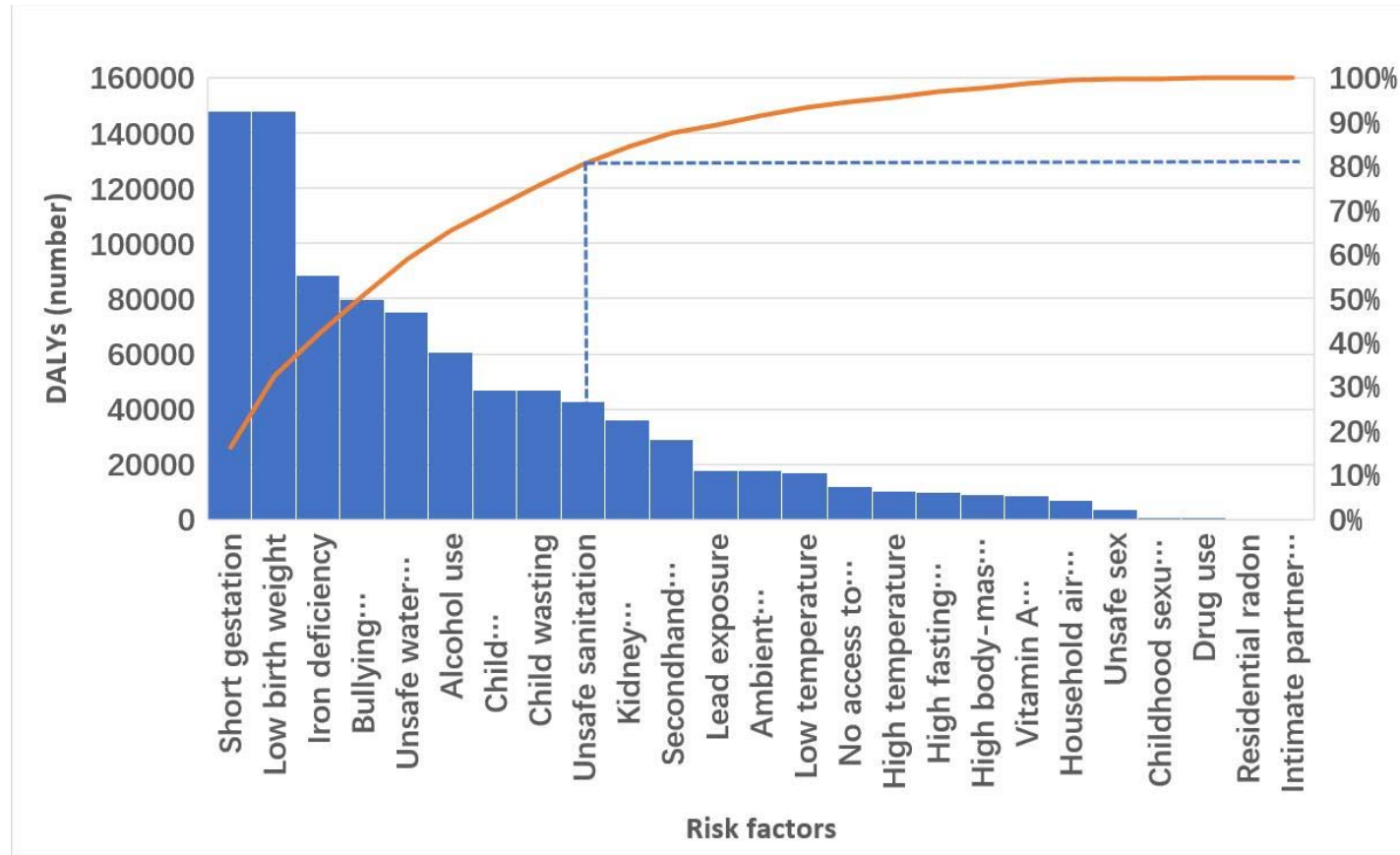




## 17 Supplementary figure 8



18 Supplementary figure 9



## 19 Legend of supplementary figures

### 19.1 Supplementary figure 1

Web interface of the Global Burden of Disease Collaborative Network.

### 19.2 Supplementary figure 2

Pareto analysis of main deaths causes of children aged < 5 years in 2019.

A: Neonatal disorders; B: Congenital birth defects; C: Unintentional injuries; D: Respiratory infections and tuberculosis; E: Neoplasms; F: Other infectious diseases; G: Transport injuries; H: HIV/AIDS and sexually transmitted infections; I: Digestive diseases; J: Cardiovascular diseases; K: Enteric infections; L: Neurological disorders; M: Nutritional deficiencies; N: Self-harm and interpersonal violence; O: Diabetes and kidney diseases; P: Chronic respiratory diseases; Q: Neglected tropical diseases and malaria; R: Skin and subcutaneous diseases; S: Substance use disorders

### 19.3 Supplementary figure 3

Pareto analysis of main DALYs causes of children aged <5 years in 2019. DALYs, disability-adjusted life-years.

A: Neonatal disorders; B: Congenital birth defects; C: Respiratory infections and tuberculosis; D: Unintentional injuries; E: Neoplasms; F: Other infectious diseases; G: Skin and subcutaneous diseases; H: Transport injuries; I: Enteric infections; J: Digestive diseases; K: HIV/AIDS and sexually transmitted infections; L: Nutritional deficiencies; M: Cardiovascular diseases; N: Neurological disorders; O: Chronic respiratory diseases; P: Mental disorders; Q: Sense organ diseases; R: Self-harm and interpersonal violence; S: Diabetes and kidney diseases; T: Neglected tropical diseases and malaria; U: Substance use disorders; V: Musculoskeletal disorders

#### 19.4 Supplementary figure 4

Pareto analysis of main deaths causes of children aged 5-14 years in 2019.

A: Unintentional injuries; B: Neoplasms; C: Transport injuries; D: Congenital birth defects; E: Respiratory infections and tuberculosis; F: Self-harm and interpersonal violence; G: Cardiovascular diseases; H: Other infectious diseases; I: Neurological disorders; J: Diabetes and kidney diseases; K: Digestive diseases; L: Enteric infections; M: HIV/AIDS and sexually transmitted infections; N: Chronic respiratory diseases; O: Musculoskeletal disorders; P: Neglected tropical diseases and malaria; Q: Nutritional deficiencies; R: Skin and subcutaneous diseases; T: Mental disorders; U: Neonatal disorders; V: Substance use disorders

#### 19.5 Supplementary figure 5

Pareto analysis of main DALYs causes of children aged 5-14 years in 2019. DALYs, disability-adjusted life-years.

A: Mental disorders; B: Unintentional injuries; C: Skin and subcutaneous diseases; D: Neoplasms; E: Transport injuries; F: Neurological disorders; G: Neonatal disorders; H: Congenital birth defects; I: Respiratory infections and tuberculosis; J: Chronic respiratory diseases; K: Musculoskeletal disorders; L: Sense organ diseases; M: Nutritional deficiencies; N: Cardiovascular diseases; O: Enteric infections; P: Self-harm and interpersonal violence; Q: Other infectious diseases; R: Digestive diseases; S: Neglected tropical diseases and malaria; T: Diabetes and kidney diseases; U: HIV/AIDS and sexually transmitted infections; V: Substance use disorders

#### 19.6 Supplementary figure 6

Pareto analysis of main risk factors of deaths for children aged < 5 years in 2019.

#### 19.7 Supplementary figure 7

Pareto analysis of main risk factors of DALYs for children aged < 5 years in 2019. DALYs, disability-adjusted life-years

### **19.8 Supplementary figure 8**

Pareto analysis of main risk factors of deaths for children aged 5-14 years in 2019.

### **19.9 Supplementary figure 9**

Pareto analysis of main risk factors of DALYs for children aged 5-14 years in 2019. DALYs, disability-adjusted life-years