

GBD PROFILE: TONGA

GLOBAL BURDEN OF DISEASES, INJURIES, AND RISK FACTORS STUDY 2010

The Global Burden of Disease Study 2010 (GBD 2010) is a collaborative project of nearly 500 researchers in 50 countries led by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. It is the largest systematic scientific effort in history to quantify levels and trends of health loss due to diseases, injuries, and risk factors. GBD serves as a global public good to inform evidence-based policymaking and health systems design.

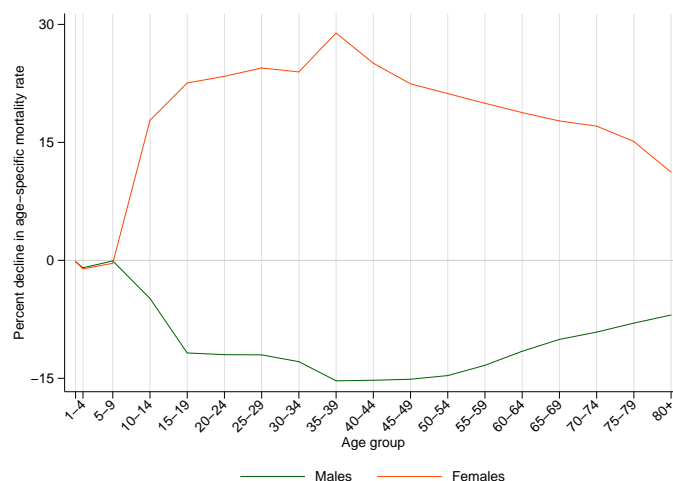
PROFILE OVERVIEW

- In terms of the number of years of life lost (YLLs) due to premature death in Tonga, diabetes mellitus, ischemic heart disease, and lower respiratory infections were the highest ranking causes in 2010.
- Of the 25 most important causes of burden, as measured by disability-adjusted life years (DALYs), meningitis showed the largest decrease, falling by 34% from 1990 to 2010.
- The leading risk factor in Tonga is high body-mass index.

ALL-CAUSE MORTALITY RATE

- This chart shows the change in mortality rate at every age range. The points above 0 on the chart indicate positive declines in the all-cause mortality rate, while points below 0 indicate an increase in mortality rate between 1990 and 2010.
- The greatest reductions in all-cause mortality rate were experienced by females aged 35-39 years (29%). Males aged 35-39 years saw the largest increase in mortality rate (15%).

Percent decline in age-specific mortality rate by sex from 1990-2010 in Tonga



CAUSES OF PREMATURE DEATH

Years of life lost (YLLs) quantify premature mortality by weighting younger deaths more than older deaths.

Ranks for top 25 causes of YLLs 1990-2010, Tonga

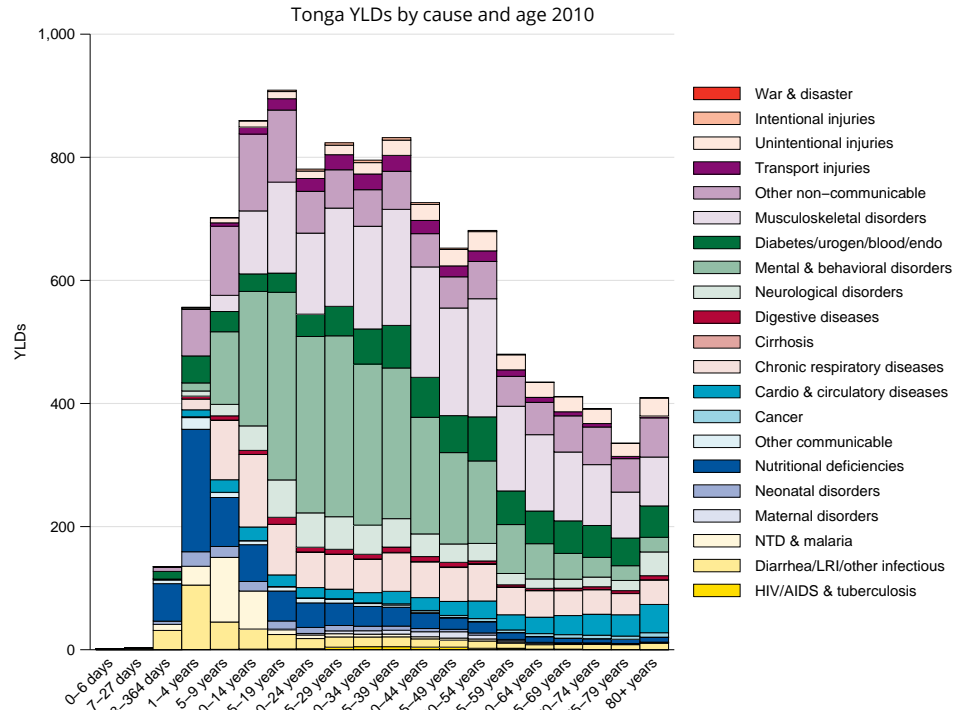
# YLLs in hundreds (% of total)	Rank and disorder 1990	Rank and disorder 2010	# YLLs in hundreds (% of total)	% change
12 (6.7%)	1 Ischemic heart disease	1 Diabetes	15 (7.6%)	47
10 (5.8%)	2 Diabetes	2 Ischemic heart disease	12 (5.9%)	-2
9 (5.0%)	3 Lower respiratory infections	3 Lower respiratory infections	8 (4.0%)	-10
8 (4.6%)	4 Preterm birth complications	4 Stroke	7 (3.5%)	-14
8 (4.6%)	5 Stroke	5 Preterm birth complications	7 (3.6%)	-12
7 (3.8%)	6 Meningitis	6 Congenital anomalies	6 (2.8%)	14
5 (2.8%)	7 Diarrheal diseases	7 Chronic kidney disease	5 (2.5%)	85
5 (2.7%)	8 Congenital anomalies	8 Road injury	5 (2.4%)	2
5 (2.6%)	9 Road injury	9 Meningitis	4 (2.2%)	-35
4 (2.2%)	10 Interpersonal violence	10 Drug use disorders	7 (3.4%)	252
4 (2.1%)	11 Cirrhosis	11 Interpersonal violence	4 (2.1%)	7
4 (2.1%)	12 Neonatal encephalopathy	12 Cirrhosis	4 (2.0%)	9
4 (2.0%)	13 Asthma	13 Liver cancer	4 (1.9%)	41
4 (2.5%)	14 Measles	14 Asthma	3 (1.8%)	0
3 (1.9%)	15 Tuberculosis	15 Neonatal encephalopathy	3 (1.7%)	-11
3 (1.7%)	16 Self-harm	16 Other musculoskeletal	3 (1.7%)	247
3 (1.8%)	17 Neonatal sepsis	17 Self-harm	3 (1.6%)	4
3 (1.8%)	18 Protein-energy malnutrition	18 Diarrheal diseases	3 (1.5%)	-39
3 (1.5%)	19 Liver cancer	19 Neonatal sepsis	3 (1.4%)	-12
3 (1.5%)	20 Chronic kidney disease	20 COPD	2 (1.1%)	28
2 (1.2%)	21 Drowning	21 Protein-energy malnutrition	2 (1.1%)	-33
2 (1.1%)	22 Stomach cancer	22 Adverse medical treatment	2 (1.0%)	27
2 (1.1%)	23 Maternal disorders	23 Drowning	2 (0.9%)	-7
2 (1.0%)	24 COPD	24 Acute hepatitis B	2 (0.9%)	16
2 (1.0%)	25 Epilepsy	25 Epilepsy	2 (0.9%)	-1
	27 Acute hepatitis B	27 Tuberculosis		
	30 Drug use disorders	28 Stomach cancer		
	31 Adverse medical treatment	39 Maternal disorders		
	42 Other musculoskeletal	53 Measles		

This chart shows the change in the top 25 causes of YLLs due to premature mortality from 1990 to 2010. Solid lines indicate a cause has moved up in rank or stayed the same. Broken lines indicate a cause has moved down in rank. The causes are color coded by blue for non-communicable diseases, green for injuries, and red for communicable, maternal, neonatal, and nutritional causes of death.

YEARS LIVED WITH DISABILITY (YLDs)

Years lived with disability (YLDs) are estimated by weighting the prevalence of different conditions based on severity. The top five leading causes of YLDs in Tonga are low back pain, major depressive disorder, iron-deficiency anemia, diabetes mellitus, and neck pain.

The size of the colored portion in each bar represents the number of YLDs attributable to each cause. The height of each bar shows which age groups had the most YLDs in 2010. The causes are aggregated. For example, musculoskeletal disorders include low back pain and neck pain.

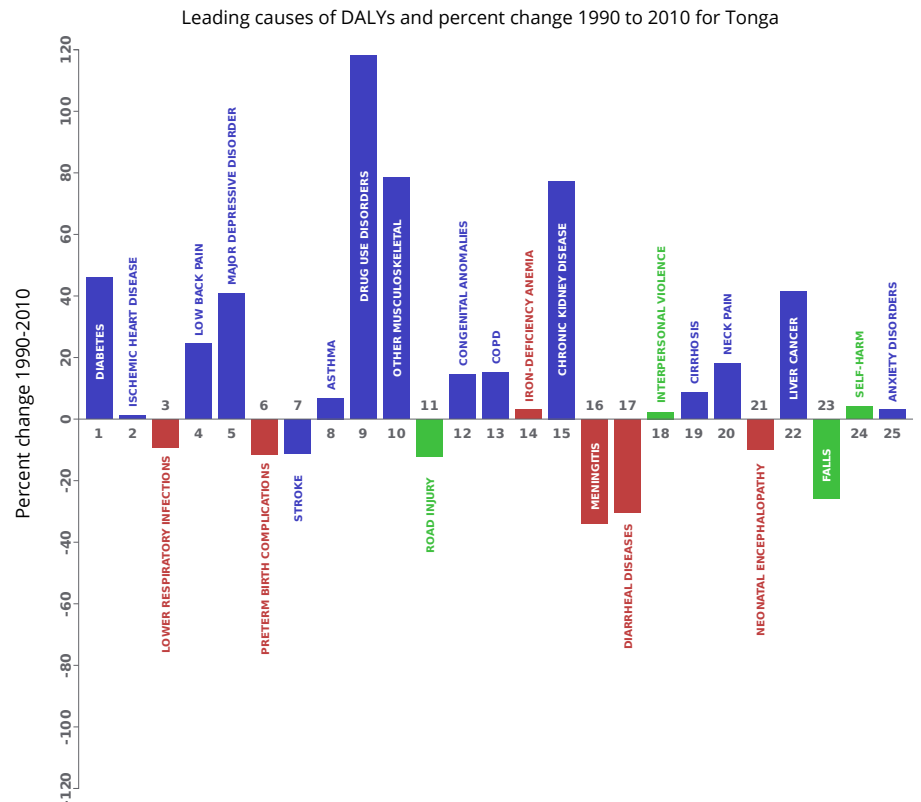


DISABILITY-ADJUSTED LIFE YEARS (DALYs)

Disability-adjusted life years (DALYs) quantify both premature mortality (YLLs) and disability (YLDs) within a population. In Tonga, the top three causes of DALYs in 2010 were diabetes mellitus, ischemic heart disease, and lower respiratory infections. The causes that were in the 10 leading causes of DALYs in 2010 and not 1990 were major depressive disorder, drug use disorders, and other musculoskeletal disorders.

The top 25 causes of DALYs are ranked from left to right in order of the number of DALYs they contributed in 2010. Bars going up show the percent by which DALYs have increased since 1990. Bars going down show the percent by which DALYs have decreased. Globally, non-communicable diseases and injuries are generally on the rise, while communicable, maternal, neonatal, and nutritional causes of DALYs are generally on the decline.

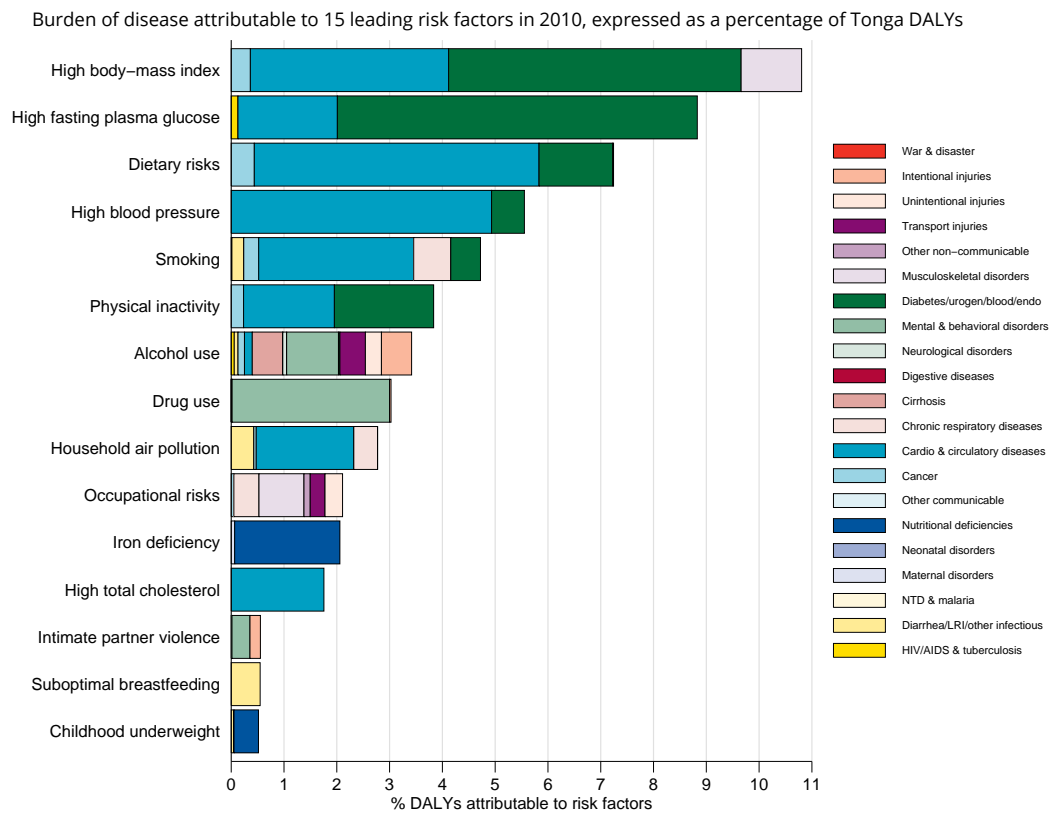
- Communicable, maternal, neonatal, and nutritional
- Non-communicable
- Injuries



RISK FACTORS

Overall, the three risk factors that account for the most disease burden in Tonga are high body-mass index, high fasting plasma glucose, and dietary risks. The leading risk factors for children under 5 and adults aged 15-49 years were childhood underweight and high body-mass index, respectively, in 2010.

The graph shows the top 15 risk factors for Tonga. The colored portion of each bar represents the specific diseases attributable to that risk factor while bar size represents the percentage of DALYs linked to specific risk factors.



COUNTRY BENCHMARKING OF BURDEN OF DISEASE

Understanding the relative performance of Tonga against other comparator countries provides key insight into public health successes and areas where Tonga might be falling behind. The table identifies Tonga's rank across 14 other comparator countries, selected and ordered by income per capita, for five metrics of interest, with 1 indicating the best rank and 15 indicating the worst rank.

- Age-standardized rates are used to make meaningful comparisons across time by adjusting for changes in population size and age structure.
- Life expectancy incorporates mortality, and health-adjusted life expectancy further incorporates years lived in less than ideal health.
- In 2010, Tonga ranked 10th for health-adjusted life expectancy and 11th for age-standardized YLD rate.

Age-standardized death rates, YLL rates, YLD rates, and life expectancy at birth and health-adjusted life expectancy at birth for 1990 and 2010, both sexes combined																				
Country	Age-standardized death rate (per 100,000)				Age-standardized YLL rate (per 100,000)				Age-standardized YLD rate (per 100,000)				Life expectancy at birth				Health-adjusted life expectancy at birth			
	1990		2010		1990		2010		1990		2010		1990		2010		1990		2010	
	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	LE	Rank	LE	Rank	HALE	Rank	HALE	Rank
Ecuador	700	2	522	1	22,420	3	14,956	3	12,265	7	11,404	4	72	2	77	1	61.7	4	66.4	2
Bosnia and Herzegovina	834	6	584	3	19,064	1	12,248	1	12,186	6	11,057	2	71.9	3	76.5	2	61.8	2	66.3	3
Algeria	762	3	584	2	23,346	6	15,484	5	12,395	8	12,215	13	70.9	4	75.5	4	60.3	7	64.2	5
El Salvador	809	4	661	6	26,931	9	18,474	7	12,585	11	11,781	9	69.6	8	74.2	6	59.5	9	63.9	6
Albania	666	1	653	5	19,166	2	15,110	4	11,609	3	11,628	7	73.1	1	74.9	5	63	1	64.6	4
Ukraine	913	8	917	12	22,976	5	23,559	11	11,316	2	11,159	3	70	7	69.7	12	60.9	5	60.8	11
Marshall Islands	1,270	15	1,309	15	36,253	13	36,337	14	14,368	15	13,968	15	63.9	13	63.9	14	54	13	54.4	14
Tonga	914	9	882	11	22,822	4	22,195	10	12,546	10	11,940	11	70	6	70.4	11	60.1	8	61	10
Turkmenistan	1,144	13	919	13	39,780	15	24,522	13	11,911	5	11,933	10	62.8	14	69.3	13	54.4	12	60	12
China	896	7	607	4	24,989	8	14,024	2	9,639	1	8,782	1	69.3	9	75.7	3	61.7	3	67.8	1
Namibia	1,259	14	1,298	14	39,681	14	42,112	15	13,774	14	13,809	14	62.4	15	61.6	15	53.2	15	52.5	15
Samoa	1,088	12	863	10	28,245	10	21,441	8	12,397	9	11,587	5	67.2	10	70.8	8	58	10	61.5	8
Egypt	1,065	11	844	9	35,058	11	22,148	9	12,868	13	11,979	12	64.6	11	70.6	9	53.6	14	59.1	13
Guatemala	1,061	10	787	8	36,242	12	24,337	12	12,800	12	11,705	8	64.5	12	70.5	10	55.3	11	61	9
Armenia	809	5	674	7	24,125	7	17,197	6	11,778	4	11,588	6	70.3	5	73.9	7	60.6	6	63.7	7

COUNTRY BENCHMARKING OF BURDEN OF DISEASE, CONTINUED

This figure shows the rank of Tonga relative to the same comparator countries for the leading causes of DALYs in 1990 (top) and 2010 (bottom).

- The columns are ordered by the absolute number of DALYs in Tonga for that particular year, with greatest burden on the left.
- The numbers indicate the rank across countries for each cause in terms of age-standardized DALY rates, with 1 as the best performance and 15 as the worst.

Ranking of leading age-standardized rates of disability-adjusted life years (DALYs) relative to comparator countries in 1990																									
Country	Diabetes	Ischemic heart disease	Lower respiratory infections	Preterm birth complications	Stroke	Low back pain	Road injury	Meningitis	Asthma	Diarrheal diseases	Major depressive disorder	Iron-deficiency anemia	Congenital anomalies	COPD	Falls	Neonatal encephalopathy	Interpersonal violence	Other musculoskeletal	Tuberculosis	Cirrhosis	Measles	Neck pain	Drug use disorders	Self-harm	Protein-energy malnutrition
Ecuador	7	2	7	6	2	2	14	4	6	10	8	13	7	8	12	7	12	9	12	7	9	9	10	7	12
Bosnia and Herzegovina	8	11	1	8	14	10	1	2	5	2	10	4	6	6	11	6	1	5	5	5	2	11	2	11	2
Algeria	12	9	4	15	7	12	9	10	8	8	15	9	15	1	6	10	4	3	7	2	7	2	9	2	11
El Salvador	6	5	5	14	3	4	15	7	12	11	14	10	9	3	2	11	15	12	3	8	6	8	5	12	10
Albania	1	8	12	1	6	15	4	8	2	3	4	6	4	2	7	1	5	4	1	1	4	13	3	3	5
Ukraine	2	14	2	2	8	14	12	1	7	1	5	5	12	9	4	5	7	11	6	6	1	14	8	15	1
Marshall Islands	15	10	10	9	12	5	10	15	15	9	9	3	2	12	15	9	10	14	14	12	14	3	15	14	14
Tonga	13	6	3	3	4	7	6	14	13	6	3	8	3	5	13	2	9	13	8	10	13	5	12	8	7
Turkmenistan	5	15	15	11	15	9	13	12	9	12	6	11	10	10	8	15	8	7	10	14	5	10	11	10	6
China	3	1	6	5	11	3	5	3	1	4	1	1	11	15	10	13	3	2	9	9	12	6	1	13	4
Namibia	11	4	11	10	1	3	11	11	14	12	14	8	14	1	12	13	6	15	3	15	15	4	5	8	8
Samoa	14	7	8	4	13	8	7	13	14	5	2	2	1	11	14	4	11	15	13	11	11	4	13	9	9
Egypt	9	12	13	12	9	13	8	6	10	13	11	12	14	13	5	3	2	1	4	15	8	1	6	1	13
Guatemala	4	3	14	13	1	11	2	5	4	15	13	15	5	4	3	8	14	8	11	13	10	7	14	6	15
Armenia	10	13	9	7	5	6	11	9	3	7	7	7	13	7	9	14	6	10	2	4	3	12	7	4	3

Ranking of leading age-standardized rates of disability-adjusted life years (DALYs) relative to comparator countries in 2010																									
Country	Diabetes	Ischemic heart disease	Lower respiratory infections	Low back pain	Major depressive disorder	Preterm birth complications	Stroke	Asthma	Drug use disorders	Other musculoskeletal	Road injury	Congenital anomalies	COPD	Iron-deficiency anemia	Chronic kidney disease	Meningitis	Diarrheal diseases	Interpersonal violence	Cirrhosis	Neck pain	Neonatal encephalopathy	Liver cancer	Falls	Self-harm	Anxiety disorders
Ecuador	6	1	10	2	5	9	2	5	5	8	15	10	4	13	9	7	8	12	6	9	9	4	8	8	14
Bosnia and Herzegovina	5	9	1	8	2	5	8	6	2	5	1	2	7	3	2	2	1	1	4	14	2	2	15	13	7
Algeria	10	8	5	13	15	15	7	10	11	3	7	11	2	10	8	10	6	4	2	2	11	3	11	1	15
El Salvador	8	7	7	4	12	8	1	11	3	12	14	12	1	8	14	4	9	15	11	8	4	5	3	14	10
Albania	1	10	8	15	9	1	10	4	10	4	8	3	5	4	5	8	2	8	1	11	3	10	14	4	12
Ukraine	2	14	3	14	3	3	11	7	12	9	11	14	6	6	1	3	4	7	12	12	10	1	13	15	2
Marshall Islands	15	11	13	7	13	13	13	15	13	15	6	8	11	5	15	15	13	11	10	3	12	14	10	11	11
Tonga	13	6	6	10	6	7	4	14	15	13	5	7	8	9	12	14	10	10	9	4	6	13	5	7	4
Turkmenistan	7	15	12	6	14	10	15	8	7	6	10	4	13	11	4	9	12	6	13	10	15	7	6	12	13
China	3	3	2	3	1	2	9	1	1	2	13	6	14	1	3	1	3	2	3	6	8	15	12	9	1
Namibia	12	4	14	1	7	14	12	4	7	4	9	15	15	7	13	15	13	5	15	14	8	2	5	6	6
Samoa	14	2	11	9	4	4	5	13	14	14	3	1	10	2	11	12	7	9	7	5	5	6	9	6	3
Egypt	4	13	9	12	10	11	14	9	9	1	12	15	12	12	13	6	11	3	15	1	1	12	7	2	5
Guatemala	11	5	15	11	11	12	3	3	6	11	2	5	3	14	10	11	14	14	14	7	7	11	1	10	9
Armenia	9	12	4	5	8	6	6	2	8	10	9	13	9	7	6	5	5	5	8	13	13	9	4	3	8

Ranking Legend	1 - 3	4 - 7	8 - 11	12 - 15