Class 2 - Major Health Challenges from a Public Health Perspective

- Morbidity and mortality worldwide
- Epidemiologic transition
- Diverse perspectives on public health

Life Expectancy

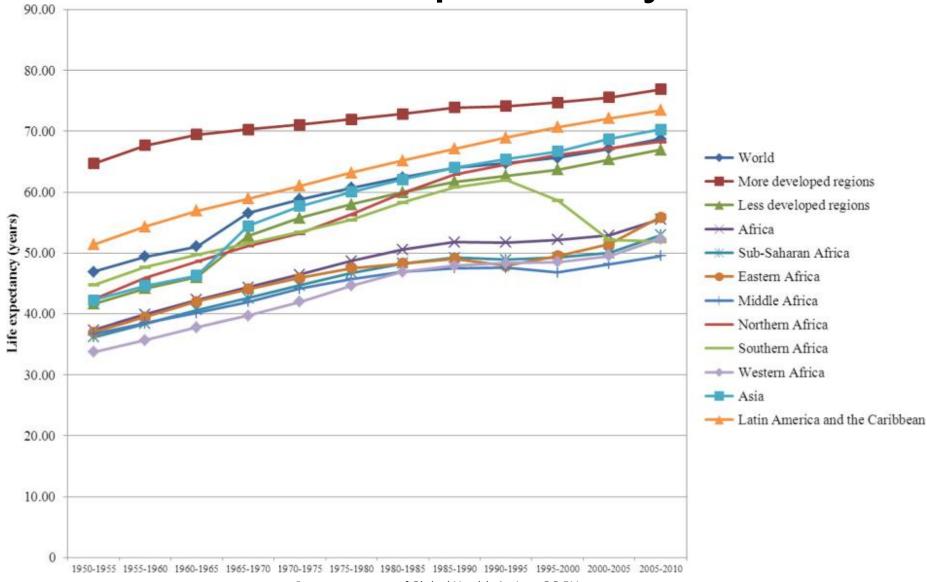


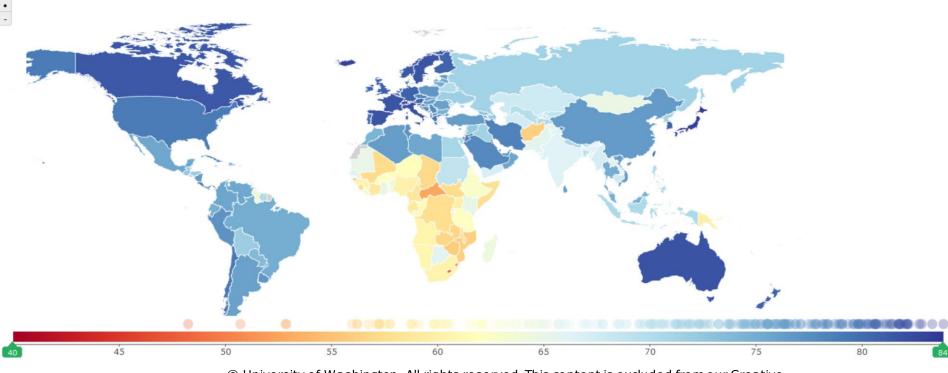
Image courtesy of Global Health Action. CC BY.

Defo, B. K. (2014). Demographic, epidemiological, and health transitions: are they relevant to population health patterns in Africa?. *Global health action*, *7*.

Life expectancy

- Global life expectancy increased by 6.2 years, 1990-2013
- Healthy life expectancy increased by 5.4 years

Life Expectancy, 2013

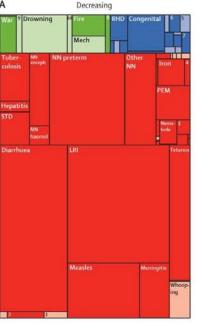


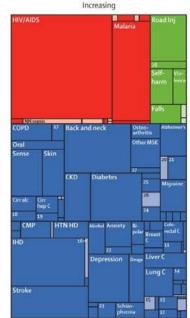
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Institute for Health Metrics and Evaluation (IHME). Life Expectancy & Probability of Death. Seattle, WA: IHME, University of Washington, 2014. Available from http://vizhub.healthdata.org/le/.

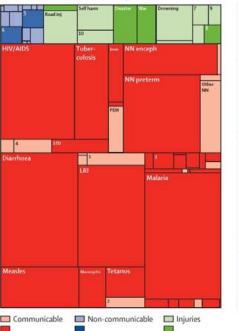
Global Burden of Disease

 A loss of welfare/subjective well-being/quality of life Figure 1 from Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). "Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition." *The Lancet*, *386*(10009), 2145-2191 removed. Please visit the journal to view the image.





Decreasing







1 Intestinal infectious diseases 2 Whooping cough 3 Maternal haemorrhage 4 Other infectious diseases 5 Stomach cancer 6 Alcohol use disorders 7 Fire, heat, and hot substances 8 Poisonings 9 Exposure to mechanical forces 10 Interpersonal violence 11 Oesophageal cancer 12 Liver cancer 13 Breast cancer 14 Prostate cancer 15 Pancreatic cancer 16 Non-Hodgkin lymphoma 17 Other neoplasms 18 Other cardiovascular and circulatory diseases 19 Cirrhosis due to hepatitis C 20 Medication overuse headache 21 Schizophrenia 22 Drug use disorders 23 Bipolar disorder 24 Other mental and substance use disorders 25 Urinary diseases and male infertility 26 Gynaecological diseases 27 Diabetes, urogenital, blood, and endocrine diseases

Increasing and decreasing global DALYs for causes from 1990 to 2005 (A) and 2005 to 2013 (B). Within each tree map, the size of the rectangle for each cause is proportional to the magnitude of the decrease or increase in DALYs for each cause. Dark shading show statistically significant changes and light shading shows changes that are not significant.

Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healt life expectancy (HALE) for 188 countries, 1990-2013: guantifying the epidemiological transition. The Lancet, 386(10009), 2145-2191. 8

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25 most common causes of global DALYs for both sexes combined, 1990, 2005, and 2013, with age-standardized median percentage change

Mean rank (95% UI)	1990 leading causes		2005 leading causes	Mean r (95% U		lardised 1990–2005	5	2013 leading causes	Mean rank (95% UI)	Age-standardised % change 2005-2013
1.1 (1-2)	1 Lower respiratory infections	h	1 Ischaemic heart disease	1.0 (1-	-13% (-1	5 to -10%)	I	1 Ischaemic heart disease	1-0 (1-1)	-11% (-15 to -6%)
2-0 (1-3)	2 Ischaemic heart disease		2 Cerebrovascular disease	2-3(2-	-14% (-1)	7 to -11%)	l	2 Cerebrovascular disease	2-2 (2-3)	-14% (-17 to -10%)
3-0 (3-3)	3 Dianhoeal diseases		3 Lower respiratory infections	2.7(2-	-39% (-4	2 to -35%)		3 Lower respiratory infections	3.4 (3-4)	-22% (-28 to -15%)
4-0 (4-4)	4 Cerebrovascular disease		4 Diarrhoeal diseases	4.8 (4	-6) -46% (-4	9 to -42%)		4 Low back and neck pain	3-5 (2-5)	0% (-1 to 3%)
5-2 (5-7)	5 Neonatal preterm birth		5 Low back and neck pain	54(3	-10) -1% (-2	to 1%)		5 COPD	5-2 (5-7)	-11% (-15 to -6%)
6-4 (5-8)	6 COPD	1.	6 Malaria	6 6.3(4	9) 35% (14	to 60%)		6 Diarrhoeal diseases	7-2 (5-11)	-32% (-38 to -26%)
7-1 (5-10)	7 Low back and neck pain		7 HIV/AIDS	6 6.5(4	9) 360% (28	0 to 438%)		7 Road injuries	7-3 (5-10)	-14% (-18 to -9%)
7.5(6-8)	8 Tuberculosis	h. /::	8 COPD	8 8-1(6	-10) -20% (-2)	5 to -15%)	1.1	8 Neonatal preterm birth	9-0 (5-14)	-24% (-32 to -17%)
9-2 (8-10)	9 Road injuries	1. 1	9 Neonatal preterm birth	8 8.3(5	-11) -33% (-3	9 to -24%)		9 HIV/AIDS	9-3(6-12)	-32% (-35 to -27%)
11-1 (9-15)	10 Neonatal encephalopathy	1.	10 Road injuries	9-8(8	-11) -2% (-10) to 2%)		10 Malaria	10-6 (6-15)	-36% (-45 to -22%)
11-4 (10-14)	11 Malaria	Y	11 Tuberculosis	12-1 (11	-15) -35% (-4	2 to -30%)		11 Depressive disorders	11-4 (5-17)	1% (-2 to 4%)
12-5 (9-16)	12 Congenital anomalies	h. 1.	12 Neonatal encephalopathy	12-5(11	1-16) -10% (-2)	2 to 2%)		12 Diabetes	11-8 (9-14)	1% (-2 to 4%)
13-1(9-19)	13 Sense organ diseases		13 Sense organ diseases	13-8 (10	0-17) -5% (-6	to -4%)	1	13 Sense organ diseases	12-1 (5-16)	3% (5to 2%)
13-9 (11-18)	14 Iron-deficiency anaemia	. ·.	14 Depressive disorders	14-1 (11	I-18) 3% (0 t	0 6%)		14 Neonatal encephalopathy	13-5 (10-17)	-18% (-27 to -7%)
14-8 (10-22)	15 Depressive disorders	- in	15 Diabetes	14-4 (1	3-16) 18% (15	to 22%)		15 Congenital anomalies	13-6 (10-17)	-5% (-16 to 2%)
17-1 (15-20)	16 Diabetes	1.	16 Congenital anomalies	14-6 (1	1-18) -14% (-2.	2 to -5%)		16 Tuberculosis	15-7 (13-18)	-27% (-32 to -21%)
17-6 (12-24)	17 Other neonatal]. / ``	17 Iron-deficiency anaemia	17-1 (15	-20) -21% (-2	5 to -18%)		17 Iron-deficiency anemia	17-5(14-21)	-12% (-14 to -10%)
18-3 (15-21)	18 Lung cancer		18 Lung cancer	18-9 (1)	7-20) -11% (-14	1 to -8%)		18 Skin diseases	18-5 (13-24)	0% (-2 to 2%)
19-7 (16-24)	19 Self-harm		19 Self-harm	18.9 (10	5-22) -8% (-1	3 to -1%)		19 Lung cancer	18-5 (17-21)	-7% (-12 to -3%)
20-4 (11-35)	20 Measles	1. 7.	20 Skin diseases	19-9 (10	5-27) 0% (-2	to 1%)		20 Chronic kidney disease	20-4 (18-23)	0% (-4 to 4%)
21-3 (16-29)	21 Drowning	11 fr	21 Chronic kidney disease	21.7 (20	0-25) 13% (5 t	016%)		21 Selt-harm	21-0 (18-25)	-17% (-25 to -8%)
22-4 (15-31)	22 Skin diseases		22 Falls	22.7 (21	-25) -7% (-1	8 to -4%)		22 Falls	24-0 (22-28)	-13% (-18 to -9%)
22-6 (17-28)	23 Protein-energy malnutrition	1 A.K.	23 Protein-energy malnutrition	24.4 (2)	-32) -21% (-3)) to -12%)		23 Neonatal sepsis	24.2 (17-36)	-6% (-21 to 13%)
23-5(19-27)	24 Meningitis	.V. X	24 Neonatal sepsis	24.9 (1)	8-39) 11% (-9	to 39%)		24 Alzheimer's disease	25-2 (23-28)	-2% (-6 to 1%)
24-3 (21-27)	25 Falls	PK. V	25 Other neonatal	25-3 (20	-32) -38% (-4	9 to -24%)		25 Migraine	26-0 (18-39)	1% (-2 to 3%)
	28 Chronic kidney disease 30 Neonatal sepsis	Prill	26 Alzheimer's disease 27 Migraine				1	 26 Protein-energy malnutrition 28 Other neonatal 		
	42 HIV/AIDS		'28 Drowning '31 Meningitis '42 Measles			Key [Communicable,	maternal, neonatal, and nutritional	Non-comr	nunicable 🔲 Injuries

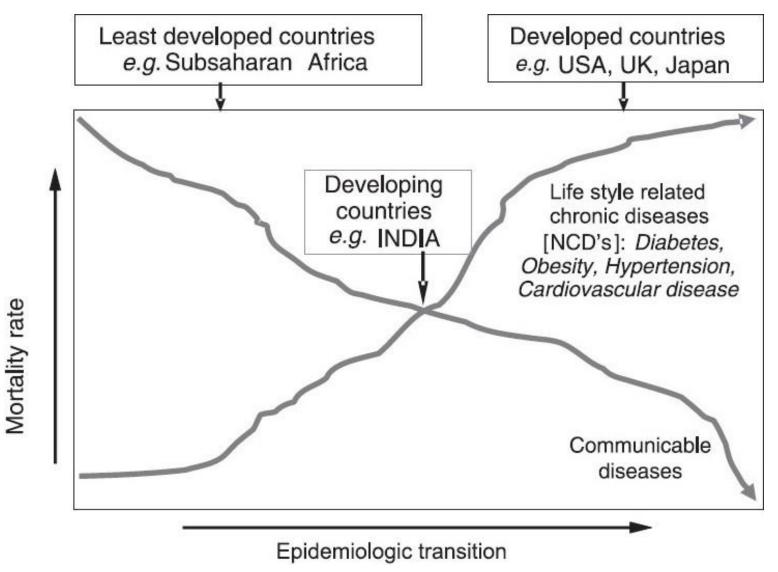
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Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *The Lancet, 386*(10009), 2145-2191.

Figure 2 from Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). "Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition." *The Lancet, 386*(10009), 2145-2191 removed. Please visit the journal to view the image.

Total DALYs, crude DALY rates, and age-standardised DALY rates from 1990 to 2013

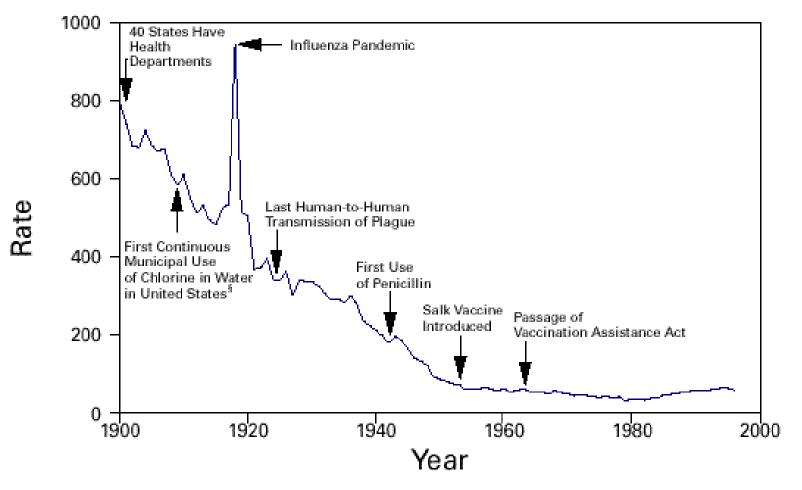
Changes in global DALYs caused by communicable, maternal, neonatal, and nutritional disorders, non- communicable diseases, and injuries shown in terms of numbers of DALYs (A), DALY rates per 100 000 people (B), and age-standardised DALY rates per 100 000 people (C). The difference in trends between A and B is caused by population growth and the difference between B and C because of changes in the percentage distribution of the population by age. Shaded areas show 95% uncertainty intervals. DALY=disability-adjusted life-years.





Anjana, R. M., Ali, M. K., Pradeepa, R., Deepa, M., Datta, M., Unnikrishnan, R., ... & Mohan, V. (2011). The need for obtaining accurate nationwide estimates of diabetes prevalence in India-rationale for a national study on diabetes. *The Indian journal of medical research*, 133(4), 369.

FIGURE 1. Crude death rate* for infectious diseases — United States, 1900–1996[†]



*Per 100,000 population per year.

[†]Adapted from Armstrong GL, Conn LA, Pinner RW. Trends in infectious disease mortality in the United States during the 20th century. JAMA 1999:281;61–6.

[§]American Water Works Association. Water chlorination principles and practices: AWWA manual M20. Denver, Colorado: American Water Works Association, 1973.

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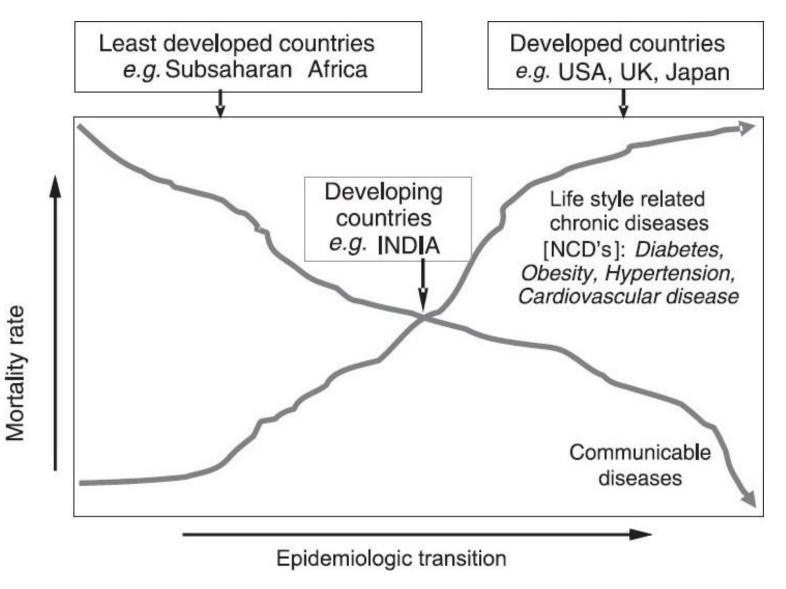
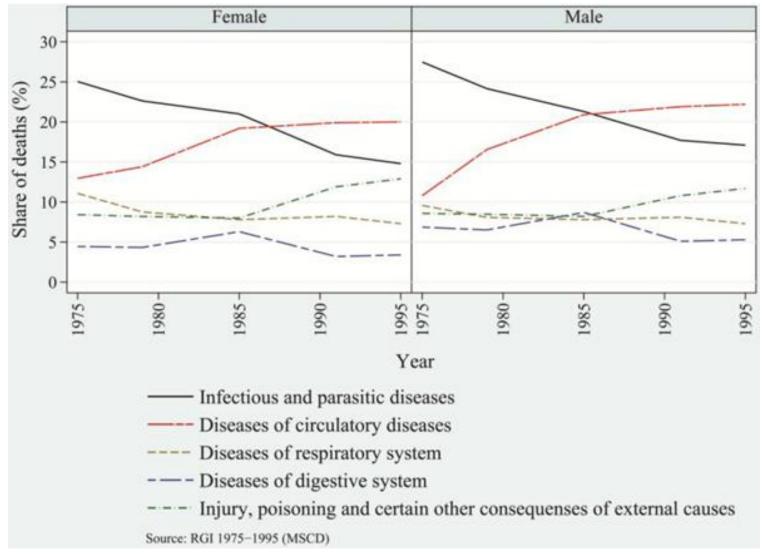


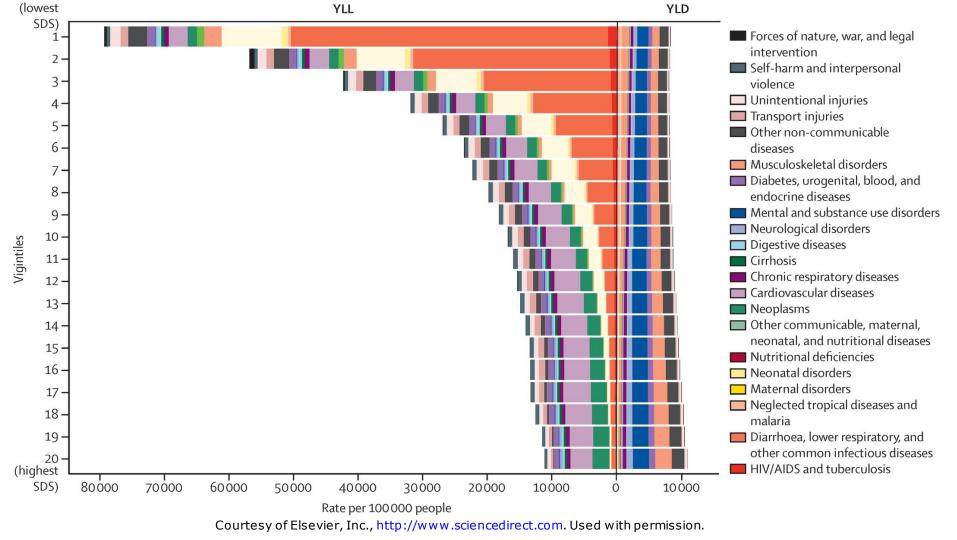
Image courtesy of Global Health Action. CC BY.

Anjana, R. M., Ali, M. K., Pradeepa, R., Deepa, M., Datta, M., Unnikrishnan, R., ... & Mohan, V. (2011). The need for obtaining accurate nationwide estimates of diabetes prevalence in India-rationale for a national study on diabetes. *The Indian journal of medical research*, *133*(4), 369.

Epidemiological Transition – Urban India



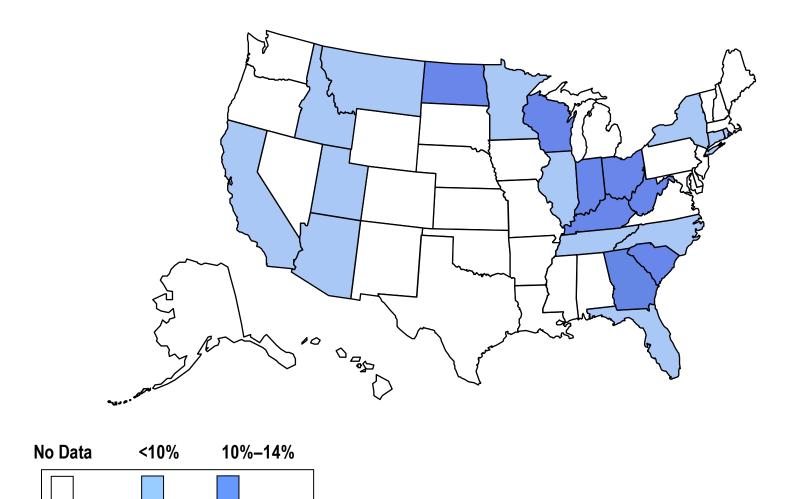


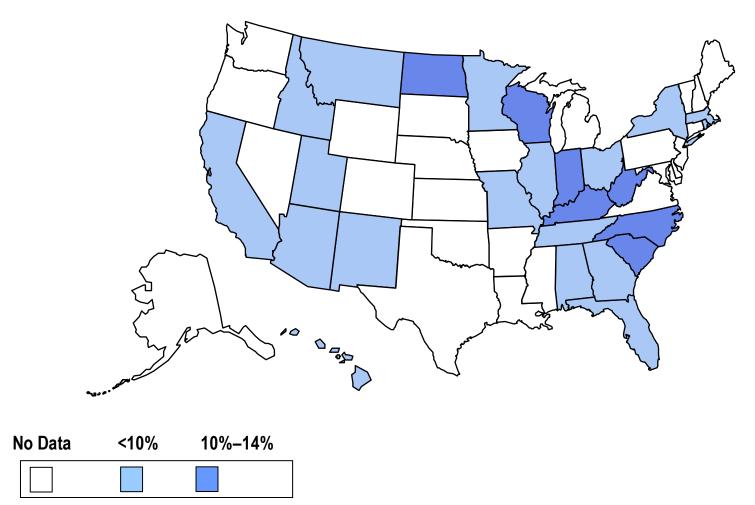


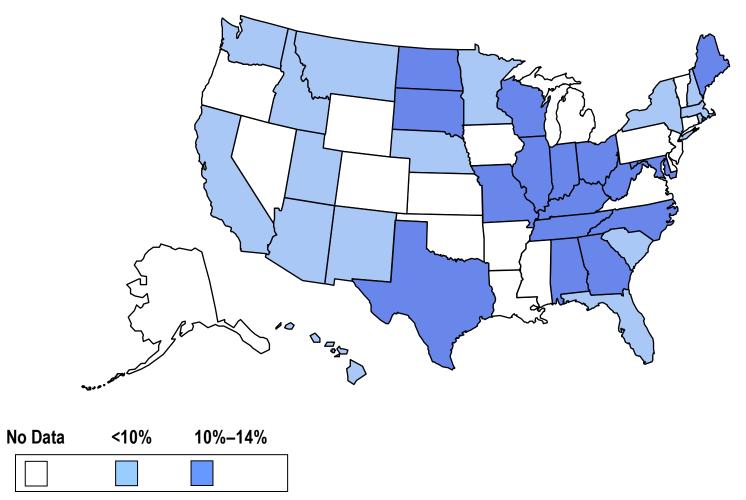
Murray, C. J., Barber, R. M., Foreman, K. J., Ozgoren, A. A., Abd-Allah, F., Abera, S. F., ... & Abu-Rmeileh, N. M. (2015). Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990–2013: quantifying the epidemiological transition. *The Lancet*, *386*(10009), 2145-2191.

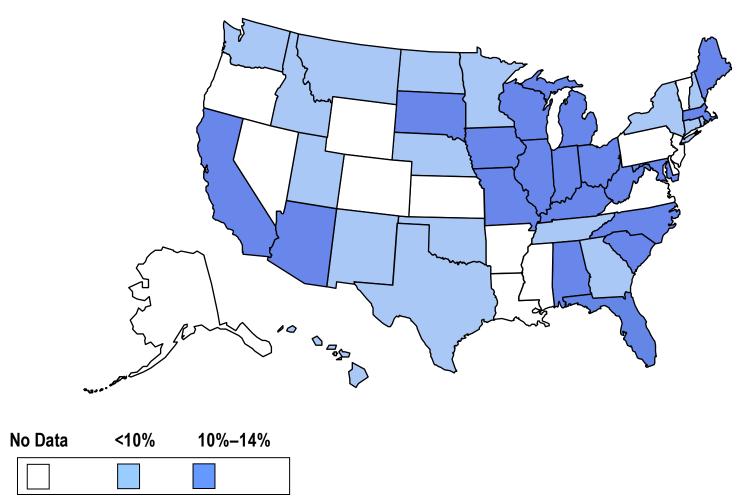
YLL and YLD cause composition of DALY rates by sociodemographic status vigintile. The epidemiological transition based on predicted YLL and YLD rates per 100 000 people as a function of the level of sociodemographic status by vigintile and broken down into GBD level 2 causes. These predicted levels control for variation explained by year and country. YLL= years of life lost. YLD=years lived with disability. GBD=Global Burden of Disease.

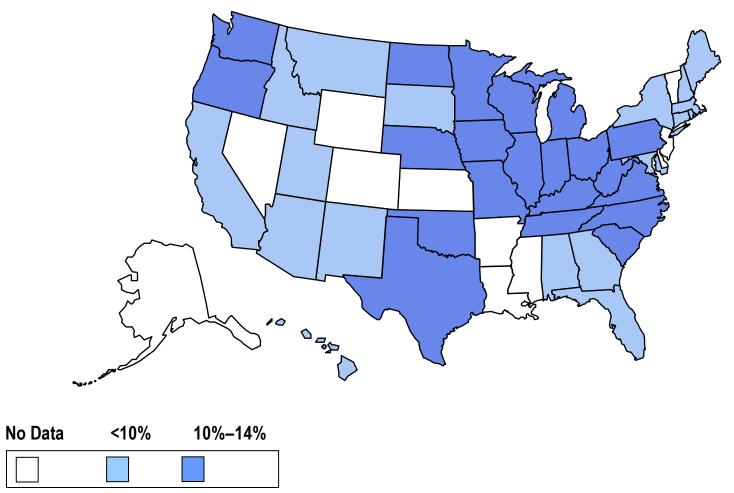
Obesity Trends* Among U.S. Adults *BM ≥30, or ~ 30 lbs overweight for 5'4" person BRFSS, 1985

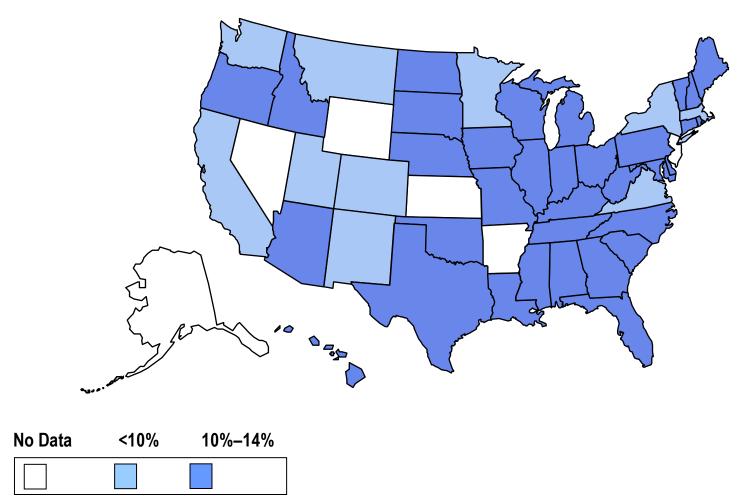




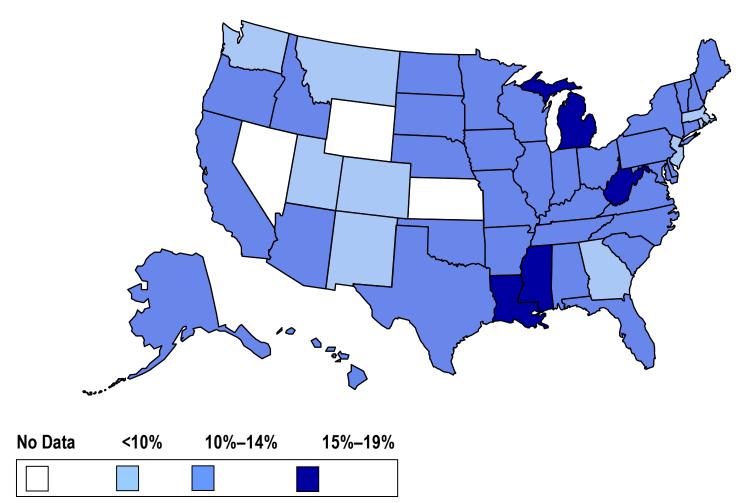




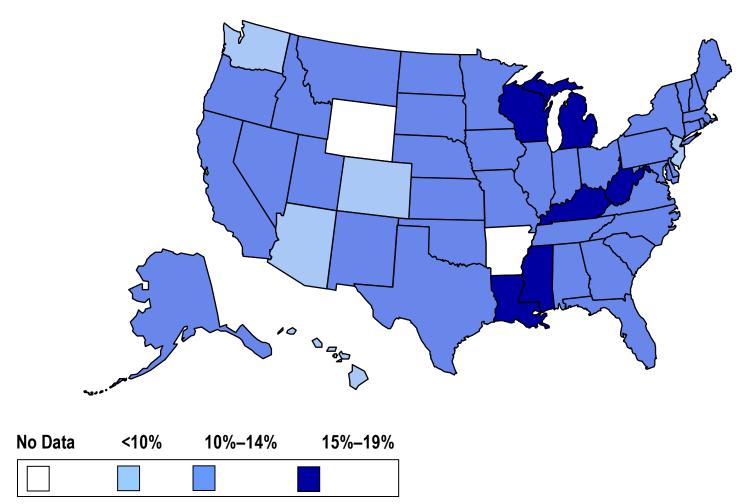


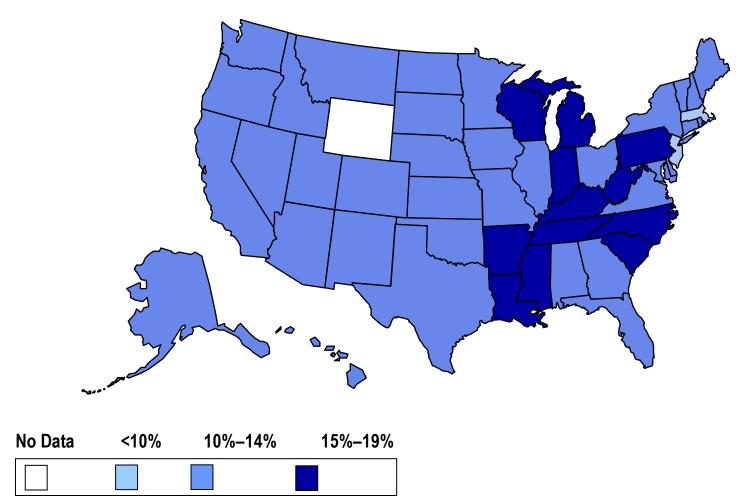




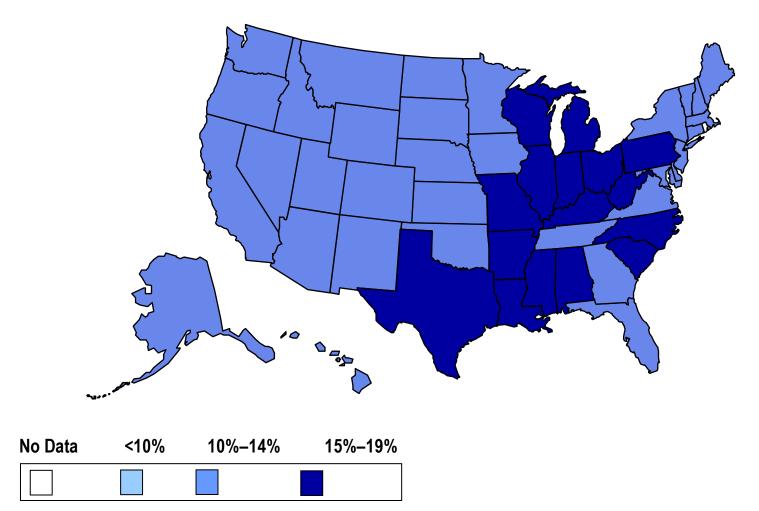


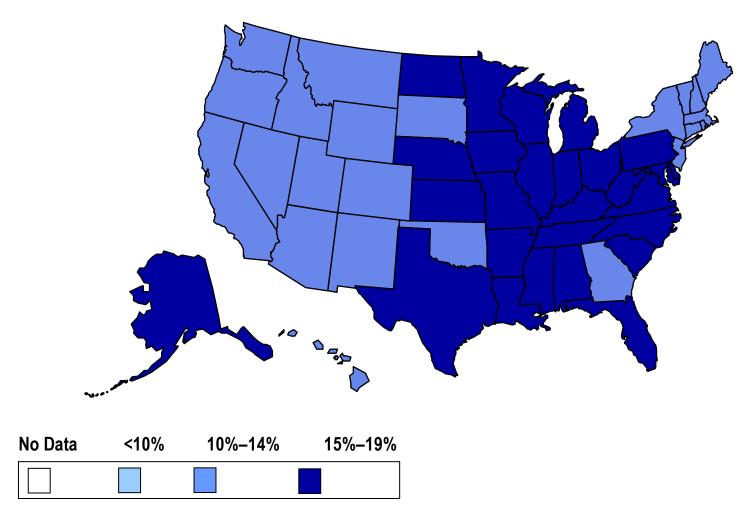
Source: Behavioral Risk Factor Surveillance System, CDC

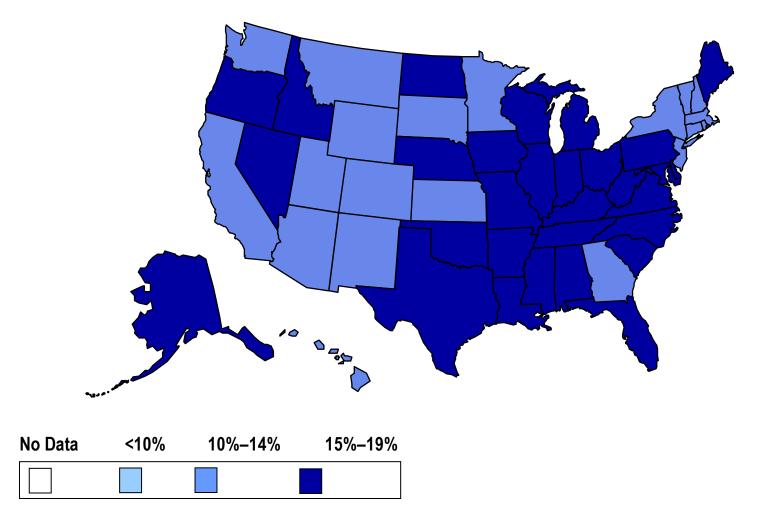


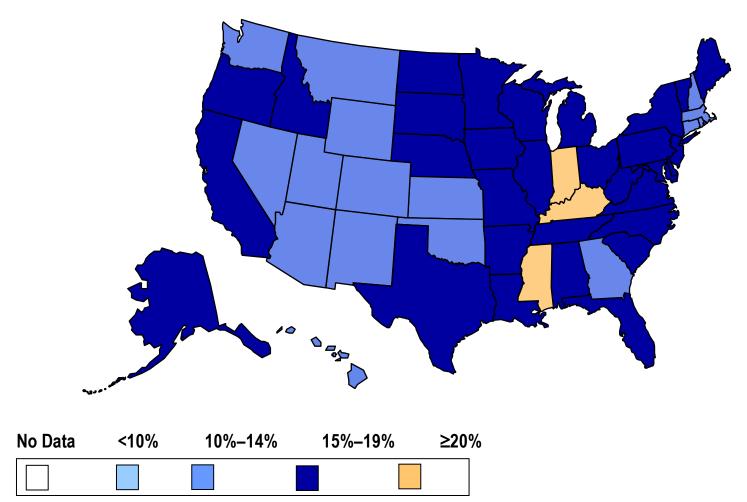


Source: Behavioral Risk Factor Surveillance System, CDC

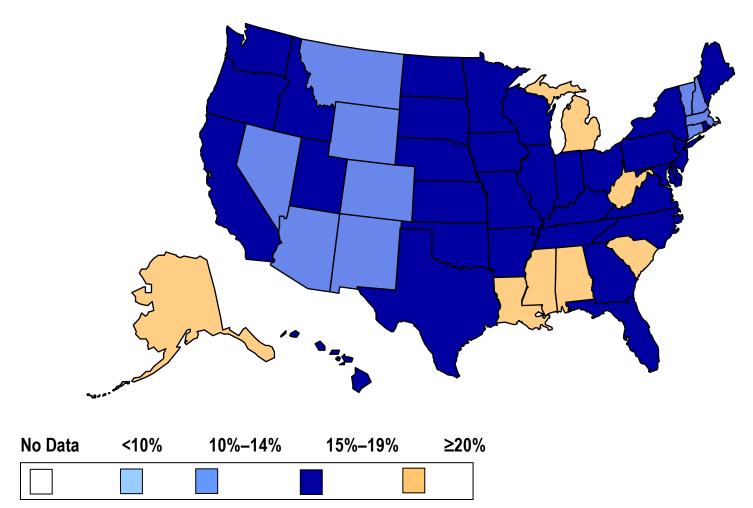




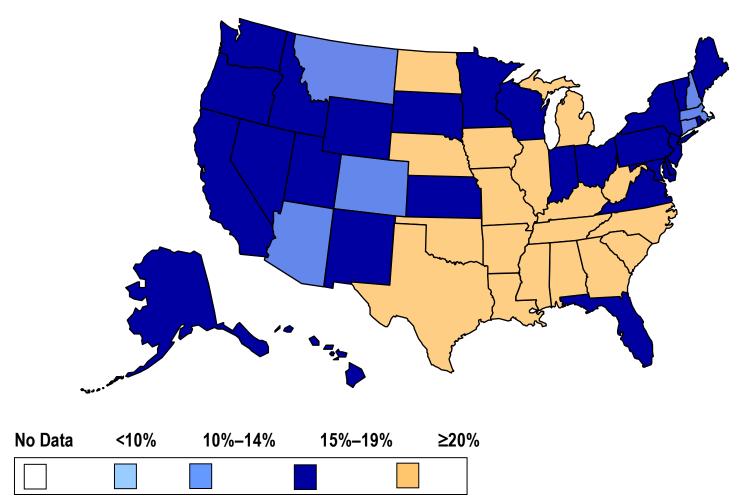




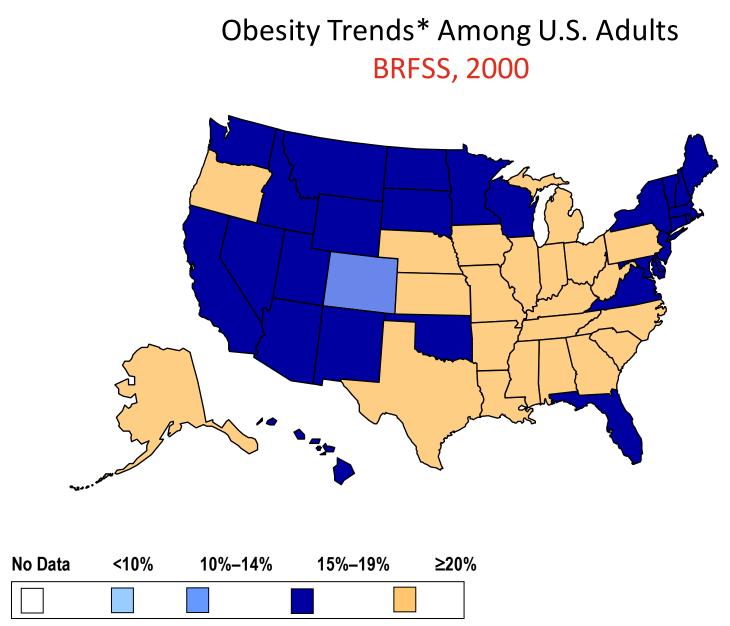
Source: Behavioral Risk Factor Surveillance System, CDC



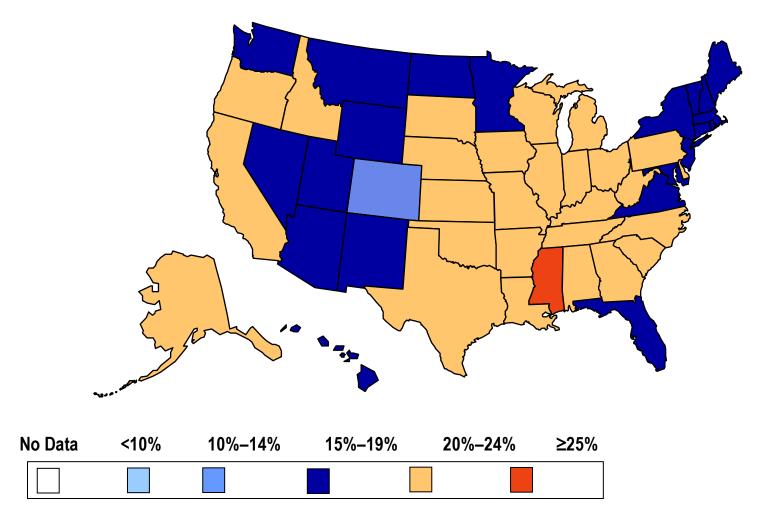
Source: Behavioral Risk Factor Surveillance System, CDC



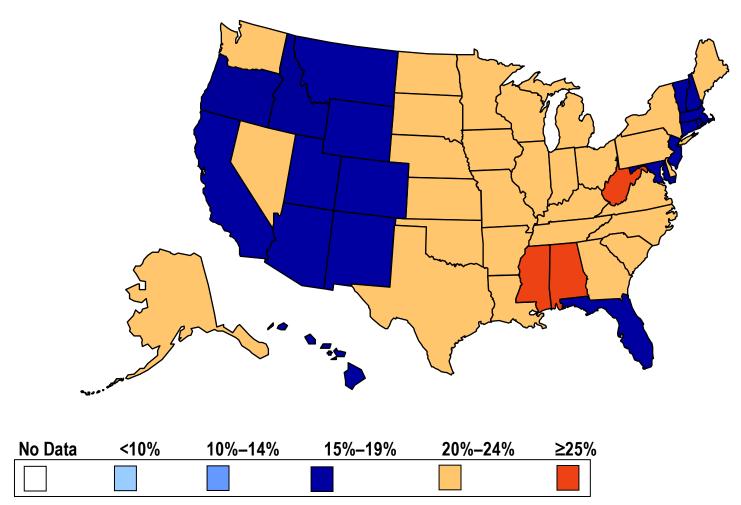
Source: Behavioral Risk Factor Surveillance System, CDC



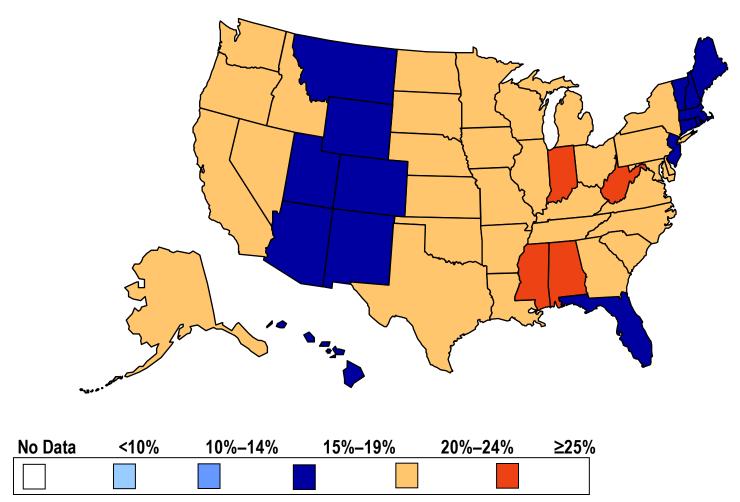
Source: Behavioral Risk Factor Surveillance System, CDC



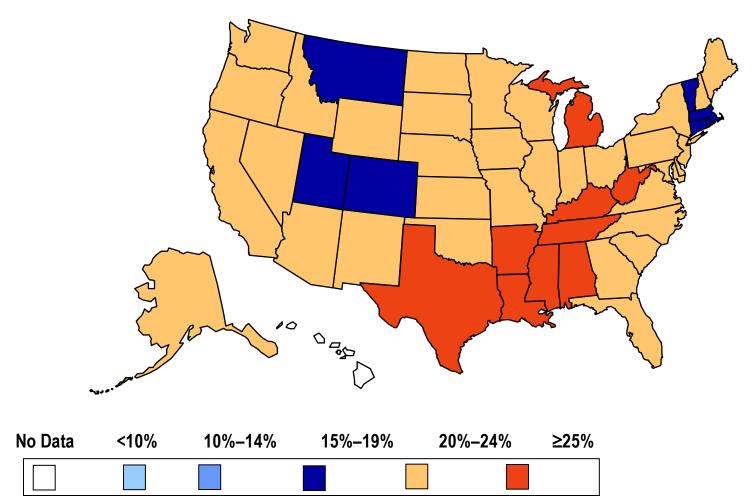
Source: Behavioral Risk Factor Surveillance System, CDC



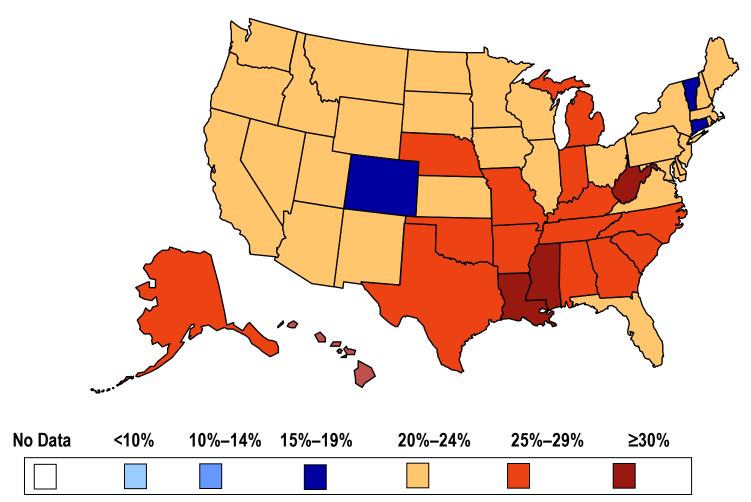
Source: Behavioral Risk Factor Surveillance System, CDC



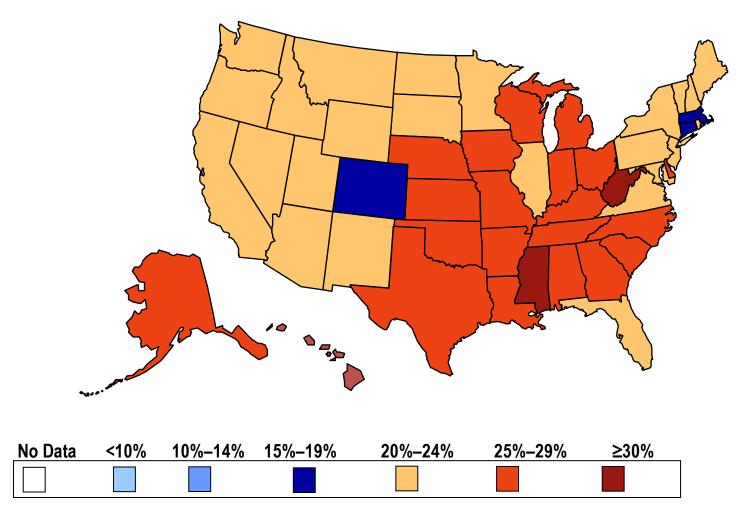
Source: Behavioral Risk Factor Surveillance System, CDC



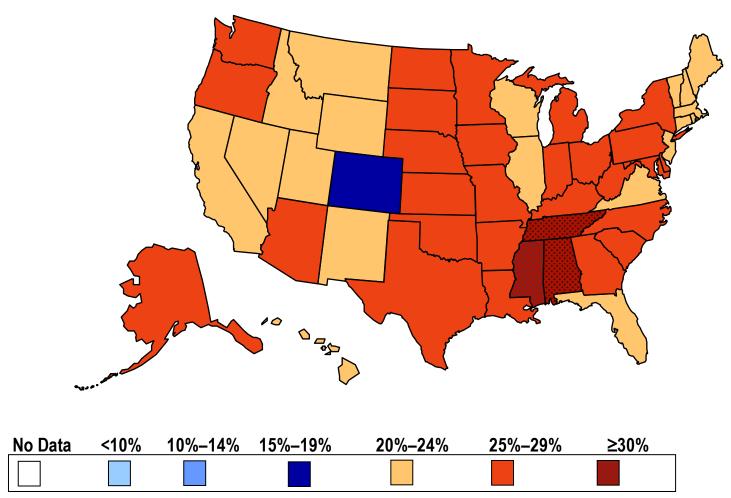
Source: Behavioral Risk Factor Surveillance System, CDC



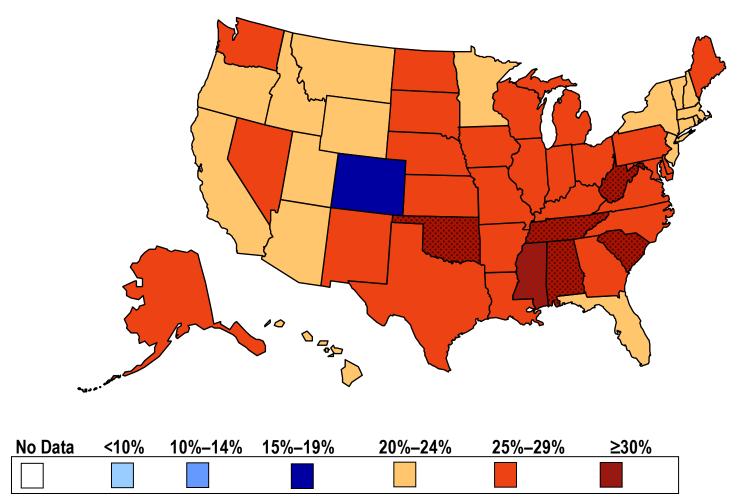
Source: Behavioral Risk Factor Surveillance System, CDC



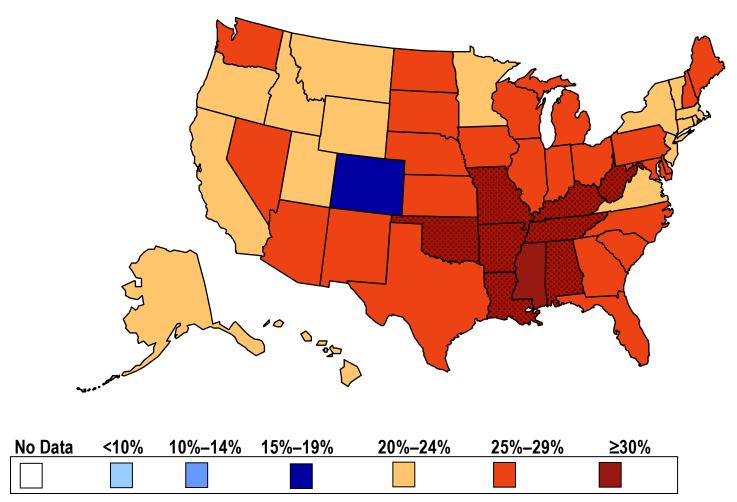
Source: Behavioral Risk Factor Surveillance System, CDC



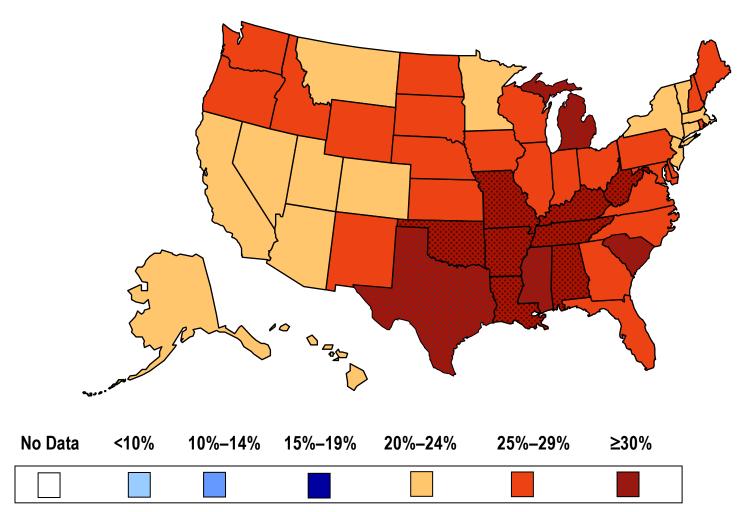
Source: Behavioral Risk Factor Surveillance System, CDC



Source: Behavioral Risk Factor Surveillance System, CDC



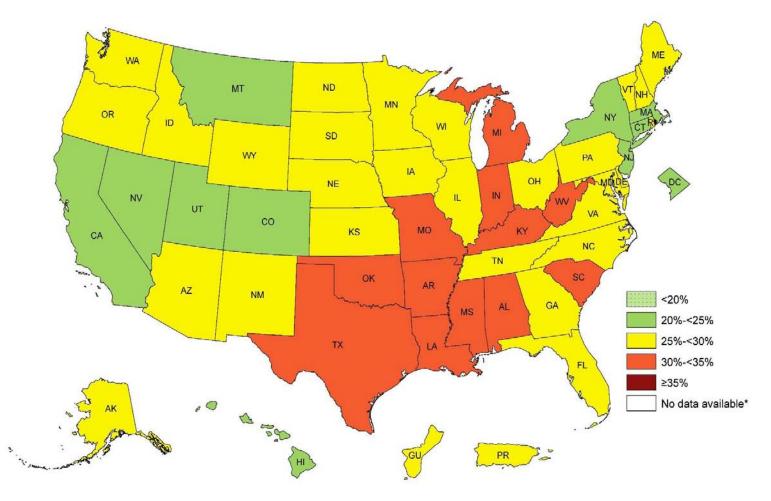
Source: Behavioral Risk Factor Surveillance System, CDC



Source: Behavioral Risk Factor Surveillance System, CDC

Prevalence[¶] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2011

¹ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.



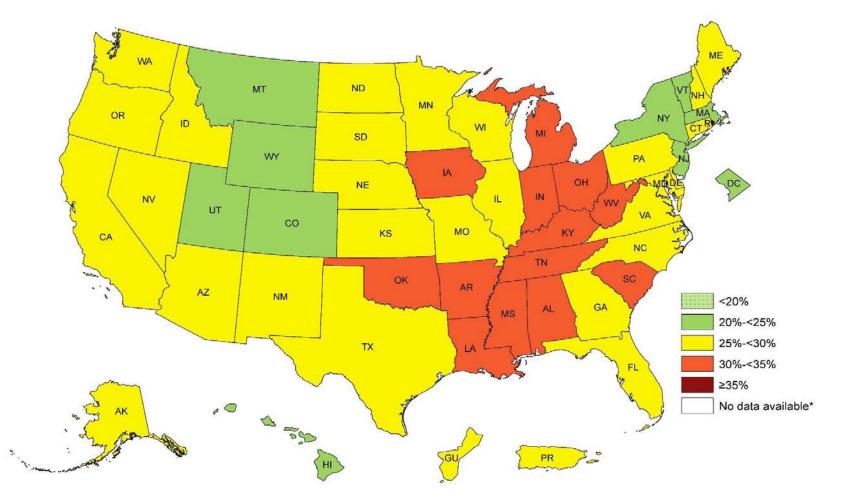
Source: Behavioral Risk Factor Surveillance System, CDC

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) \ge 30%.



Prevalence[¶] of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2012

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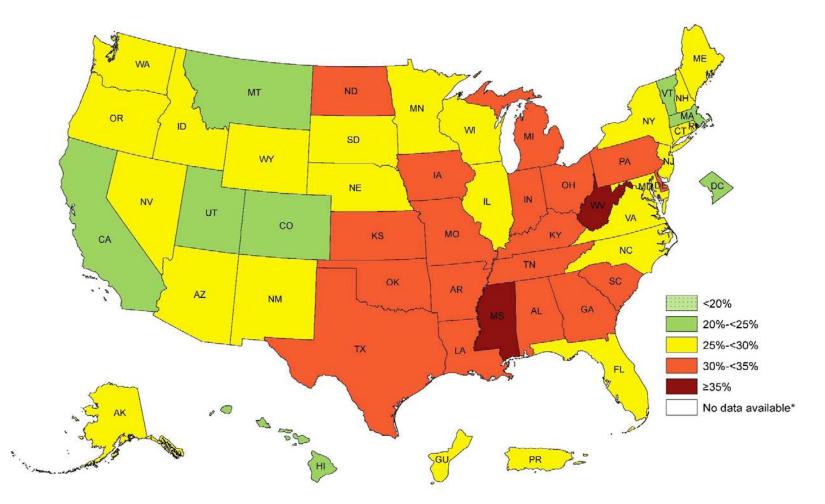
Source: Behavioral Risk Factor Surveillance System, CDC

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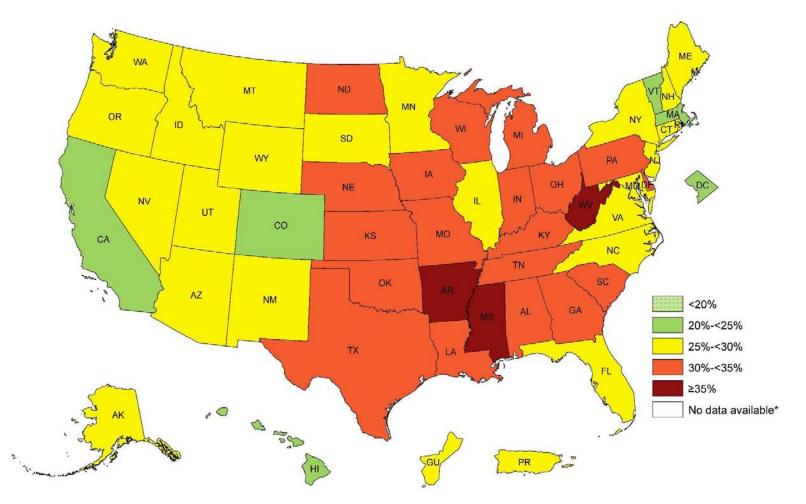
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Prevalence¹ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2014

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Source: Behavioral Risk Factor Surveillance System, CDC

*Sample size <50 or the relative standard error (dividing the standard error by the prevalence) \ge 30%.

Poor Health by Income and Race/Ethnicity

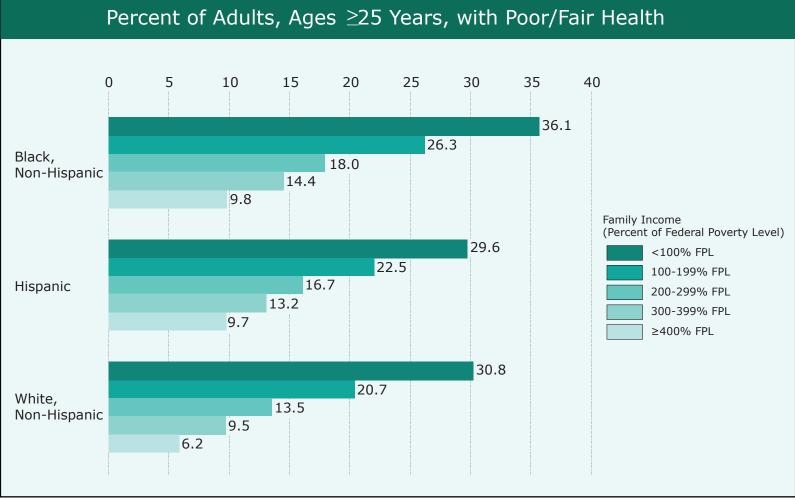
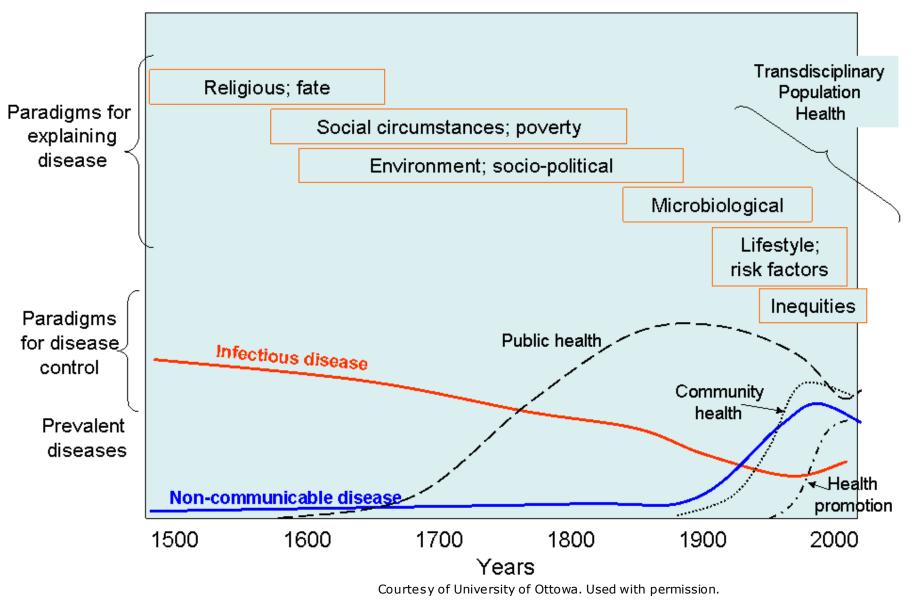


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Evolution of Public Health Models



Index of Conceptual Models of Population Health; Society, the Individual and Medicine. The University of Ottowa. http://www.med.uottawa.ca/sim/data/Models/Default models e.htm

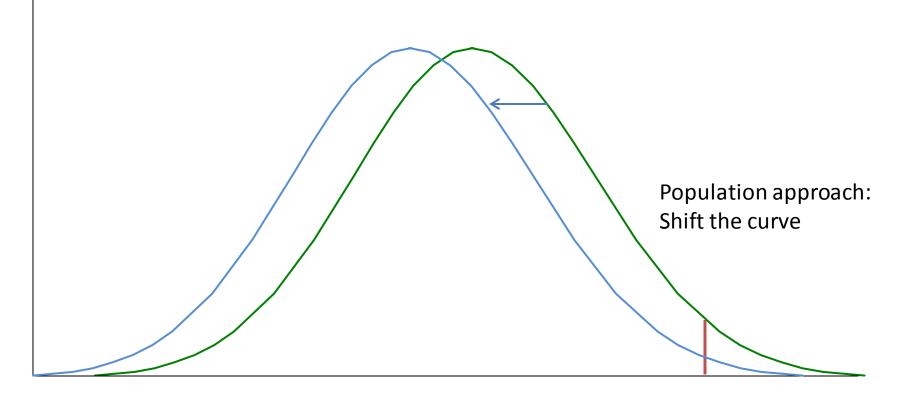
Theories of disease distribution

- Germ theory
- Lifestyle
- Psychosocial
- Social production of disease/political economy of health
- Risk factor epidemiology
- Ecosocial theory



sick worse

Health: a population perspective





worse sick

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