

Disease outcome	Sex	Age (years)	I ^a	II	III	IV
Liver cirrhosis [3,6]	Both	30≥	1.00	1.30	9.50	13.00
Pancreatitis [2,5]	Men	30≥	1.00	1.30	1.80	3.20
	Women	30≥	1.00	1.30	1.80	1.80

I, Abstainers; II, <40 g/day of ethanol intake; III, 40–59.9 g/day; IV, ≥60 g/day.

^a Reference category

^b We replaced these statistically insignificant relative risks with 1 in our analysis.

References

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Table S3: Relative risks for the effects of alcohol use on disease outcomes from Japanese studies.

Disease outcome	Men		Women	
Breast cancer [1]			Never drinker ^d	1.00
			Ex-drinker	1.41
			Occasional drinker	1.17 ^e
			1–2 times/week	1.25 ^e
			3–4 times/week	0.78 ^e
			≥5–8 times/week	1.56
Colorectal cancer [2]	Never/ex-drinker ^d	1.00	Never/ex-drinker ^d	1.00
	Occasional drinkers	1.00 ^e	Occasional drinkers	0.96 ^e
	<23.0 g/day	1.22 ^e	<23.0 g/day	0.93 ^e
	23.0–45.9 g/day	1.42	≥23.0 g/day	1.57
	46.0–68.9 g/day	1.95		
	69.0–91.9 g/day	2.15		
	≥92.0 g/day	2.96		
Esophagus cancer [3] ^a	Non-drinker ^d	1.00	Non-drinker ^d	1.00
	Occasional drinkers	0.60 ^e	Occasional drinkers	0.60 ^e
	<150.0 g/week	1.64 ^e	<150.0 g/week	1.64 ^e
	150.0–299.9 g/week	2.59	150.0–299.9 g/week	2.59
	≥300.0 g/week	4.64	≥300.0 g/week	4.64
Liver cancer [4]	Never/ex-drinker	1.70	Never/ex-drinker	1.50 ^e
	Occasional drinker ^d	1.00	Occasional drinker ^d	1.00
	<23.0 g/day	0.88 ^e	<23.0 g/day	0.86 ^e
	23.0–45.9 g/day	1.06 ^e	≥23.0 g/day	3.60
	46.0–68.9 g/day	1.07 ^e		
	69.0–91.9 g/day	1.76		
	≥92.0 g/day	1.66 ^e		
Road traffic injury [5] ^b	BAC<0.25 mg/L ^d	1.00	BAC<0.25 mg/L ^d	1.00
	≥0.25 mg/L	8.00	≥0.25 mg/L	8.00
Suicide [6] ^{a, c}	Never/ex-drinker	1.80 ^e	Never/ex-drinker	1.80 ^e
	Occasional drinker ^d	1.00	Occasional drinker ^d	1.00
	<138.0 g/week	1.20 ^e	<138.0 g/week	1.20 ^e
	138.0–251.9 g/week	1.40 ^e	138.0–251.9 g/week	1.40 ^e
	252.0–413.9 g/week	1.30 ^e	252.0–413.9 g/week	1.30 ^e
	≥414 g/week	2.10	≥414 g/week	2.10

BAC, Breath alcohol concentration.

^a Relative risks were reported for males only. We applied same values to females.

^b Relative risks were reported for both sexes combined.

^c Relative risks were estimated for suicide, and we applied same values to falls, homicide, and other injuries. These estimates excluded the first 2 years of follow-up.

^d Reference category

^e We replaced these statistically insignificant relative risks with 1 in our analysis.

References

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Table S4: Relative risks for the effects of tobacco smoking on disease outcomes.

Disease outcome ^a	Sex	Age (years)				
		30–44	45–59	60–69	70–79	≥80
Ischemic heart disease [1] ^b	Men	4.08	2.50	2.19	1.92	1.09 ^c
	Women	2.47	4.36	3.10	2.21	1.64
Total stroke [1] ^b	Men	1.41	1.41	1.26	1.13 ^c	1.02 ^c
	Women	2.75	2.75	1.85	1.24 ^c	0.98 ^c
Aortic aneurysms and dissection [2] ^b	Men	8.04	3.89	3.89	3.89	1.20 ^c
	Women	1.69 ^c	2.35	2.35	2.35	1.70
Bladder cancer [2]	Men	5.35	5.35	5.35	5.35	5.35
	Women	1.86 ^c	1.86 ^c	1.86 ^c	1.86 ^c	1.86 ^c
Cervix uteri cancer [2]	Women	2.32	2.32	2.32	2.32	2.32
Esophagus cancer [2]	Men	3.39	3.39	3.39	3.39	3.39
	Women	1.90 ^c	1.90 ^c	1.90 ^c	1.90 ^c	1.90 ^c
Kidney cancer [2]	Men	1.57 ^c	1.57 ^c	1.57 ^c	1.57 ^c	1.57 ^c
	Women	0.60 ^c	0.60 ^c	0.60 ^c	0.60 ^c	0.60 ^c
Leukemia [2]	Men	1.45 ^c	1.45 ^c	1.45 ^c	1.45 ^c	1.45 ^c
	Women	0.96 ^c	0.96 ^c	0.96 ^c	0.96 ^c	0.96 ^c
Liver cancer [2]	Men	1.81	1.81	1.81	1.81	1.81
	Women	1.73	1.73	1.73	1.73	1.73
Lung cancer [2]	Men	4.79	4.79	4.79	4.79	4.79
	Women	3.88	3.88	3.88	3.88	3.88
Mouth and pharynx cancer [2]	Men	2.66	2.66	2.66	2.66	2.66
	Women	1.97 ^c	1.97 ^c	1.97 ^c	1.97 ^c	1.97 ^c
Pancreatic cancer [2]	Men	1.58	1.58	1.58	1.58	1.58
	Women	1.81	1.81	1.81	1.81	1.81
Stomach cancer [2]	Men	1.51	1.51	1.51	1.51	1.51
	Women	1.22 ^c	1.22 ^c	1.22 ^c	1.22 ^c	1.22 ^c
Chronic obstructive pulmonary disease [2]	Men	3.09	3.09	3.09	3.09	3.09
	Women	3.55	3.55	3.55	3.55	3.55
Asthma [3]	Men	1.25 ^c	1.25 ^c	1.25 ^c	1.25 ^c	1.25 ^c
	Women	3.46	3.46	3.46	3.46	3.46
Lower respiratory tract infection [2]	Men	1.17 ^c	1.17 ^c	1.17 ^c	1.17 ^c	1.17 ^c
	Women	1.39	1.39	1.39	1.39	1.39

^a Relative risks for diabetes mellitus and tuberculosis were not reported from the pooled cohort study.

^b Relative risks were originally reported only for people aged 40–79 years old. In order to calculate relative risks for each age group, we used age-specific relative risks from meta-analyses conducted for a previous study [4].

^c We replaced these statistically insignificant relative risks with 1 in our analysis.

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Table S5: Relative risks for the effects of physical inactivity on disease outcomes.

Disease outcome ^a	Age (years) ^b	I ^{c,d}	II	III
Ischemic heart disease	30–69	1.00	1.44	1.71
	70–79	1.00	1.31	1.50
	≥80	1.00	1.20	1.30
Ischemic stroke	30–69	1.00	1.10 ^e	1.53
	70–79	1.00	1.08 ^e	1.38
	≥80	1.00	1.05 ^e	1.24
Breast cancer	30–44	1.00	1.13	1.25
	45–69	1.00	1.13	1.34
	70–79	1.00	1.09	1.25
	≥80	1.00	1.06 ^e	1.16
Colon cancer	30–69	1.00	1.18	1.68
	70–79	1.00	1.13	1.48
	≥80	1.00	1.08 ^e	1.30
Diabetes mellitus	30–69	1.00	1.24	1.45
	70–79	1.00	1.18	1.32
	≥80	1.00	1.11 ^e	1.20

^a We obtained all relative risks from Bull et al. (2004) [1].

^b Except for breast cancer, relative risks were estimated for both sexes combined.

^c Bull et al. (2004) originally defined the categories as: I, “≥2.5 hr/wk of moderate activity or ≥1 hr/wk of vigorous activity”; II, “<2.5h/wk of moderate activity or < 1h/wk of vigorous activity”; III, “no moderate or vigorous activity”. We used self-reports on the intensity of physical activity and substituted “highly intense”, “moderately intense”, and “poorly intense” for I, II, and III, respectively.

^d Reference category

^e We replaced these statistically insignificant relative risks with 1 in our analysis.

References

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Table S6: Relative risks for the effects of dietary risk factors on disease outcomes.

Risk factor, disease outcome	Unit	Age (years)					≥30
		30-44	45-59	60-69	70-79	≥80	
<i>High TFA intake</i>							
Ischemic heart disease [1]	Per 1 percentage point more calories	1.40	1.29	1.14	1.08	1.06	
<i>Low PUFA intake</i>							
Ischemic heart disease [2] ^a	Per 1 percentage point less calories	1.14	1.10	1.05	1.03	1.02	
<i>High dietary sodium intake</i>							
SBP [3]	mmHg SBP per 100 mmol/d increase						7.11 (SBP≥140) 3.27 (SBP<140)
Stomach cancer [3,4]	Per 100 mmol/d increase						1.57
<i>Low fruit and vegetable intake</i>							
Ischemic heart disease [3,5]	Per 80 g/d decrease	1.04	1.04	1.04	1.03 ^d	1.02 ^d	
Ischemic stroke [3,6]	Per 80 g/d decrease	1.06	1.06	1.06	1.05	1.03 ^d	
Ischemic stroke [3,6]	Per 80 g/d decrease	1.01 ^d	1.01 ^d	1.01 ^d	1.01 ^d	1.00 ^d	
Colorectal cancer [3,7]	Per 80 g/d decrease	1.10	1.10	1.10	1.08 ^d	1.05 ^d	
Esophagus cancer [8] ^{a,b,c}	Per 100 g/d decrease	1.04	1.04	1.04	1.03 ^d	1.02 ^d	
Lung cancer [3,7]	Per 80 g/d decrease	1.40	1.29	1.14	1.08	1.06	
Stomach cancer [3,7]	Per 80 g/d decrease	1.06 ^d	1.06 ^d	1.06 ^d	1.05 ^d	1.03 ^d	

SBP, systolic blood pressure.

^a Relative risks were reported for all ages or the specified age group. We used the age gradients of the relative risks from meta-analyses conducted for the US study to calculate relative risks for each age group [3].

^b Relative risks were estimated for males only, and we applied the same values to females.

^c We applied these relative risks for esophagus cancers to mouth and pharyngeal cancers.

^d We replaced these statistically insignificant relative risks with 1 in our analysis.

References

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Table S7: Relative risks for the effects of infections on disease outcomes.

Agent, disease outcome	Units	
<i>Hepatitis B virus</i>		
Liver cancer [1]	Anti-HCV (-) & HBsAg (-) ^b	1
	Anti-HCV (-) & HBsAg (+)	74
<i>Hepatitis C virus</i>		
Liver cancer [1]	Anti-HCV (-) & HBsAg (-) ^b	1
	Anti-HCV (+) & HBsAg (-)	36
<i>Helicobacter pylori</i>		
Stomach cancer ^a	Anti- <i>Helicobacter pylori</i> immunoglobulin G antibody sero-positivity	2.9

HCV, hepatitis C virus; HBsAg, hepatitis B surface antigen.

^a We conducted an ad-hoc analysis for this study.

^b Reference category

References

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Table S8: Population-attributable fractions of cause-specific mortality attributable to individual risk factors in men in 2007.

Risk factor, disease	Age (years)											
	20–29		30–44		45–59		60–69		70–79		≥80	
<i>High blood glucose</i>												
Ischemic heart disease		0.14	(0.01, 0.27)	0.19	(0.12, 0.29)	0.14	(0.05, 0.22)	0.14	(0.06, 0.22)	0.15	(0.06, 0.24)	
Total stroke		0.12	(-0.01, 0.25)	0.17	(0.00, 0.32)	0.18	(0.11, 0.26)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	
Diabetes mellitus		1.00		1.00		1.00		1.00		1.00		
<i>High LDL cholesterol</i>												
Ischemic heart disease		0.00	(0.00, 0.00)	0.33	(0.03, 0.55)	0.17	(0.06, 0.27)	0.17	(0.06, 0.26)	0.10	(0.03, 0.17)	
Ischemic stroke		0.27	(0.00, 0.46)	0.29	(0.11, 0.44)	0.16	(0.08, 0.24)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	
<i>High blood pressure</i>												
Ischemic heart disease		0.14	(0.09, 0.19)	0.24	(0.15, 0.33)	0.24	(0.18, 0.31)	0.10	(-0.05, 0.23)	0.12	(-0.06, 0.26)	
Total stroke		0.22	(0.17, 0.29)	0.43	(0.37, 0.49)	0.35	(0.25, 0.45)	0.32	(0.19, 0.43)	0.36	(0.21, 0.48)	
Hypertensive disease		0.62	(0.48, 0.77)	0.83	(0.72, 0.91)	0.88	(0.79, 0.95)	0.80	(0.68, 0.89)	0.77	(0.67, 0.86)	
Other selected CVD		0.38	(0.26, 0.50)	0.57	(0.47, 0.69)	0.65	(0.54, 0.76)	0.54	(0.43, 0.65)	0.52	(0.42, 0.60)	
<i>High body mass index</i>												
Ischemic heart disease		0.28	(0.15, 0.40)	0.19	(0.14, 0.24)	0.17	(0.11, 0.24)	0.11	(0.05, 0.17)	0.03	(0.01, 0.06)	
Ischemic stroke		0.28	(0.12, 0.42)	0.22	(0.12, 0.30)	0.17	(0.09, 0.25)	0.11	(0.05, 0.18)	0.00	(0.00, 0.00)	
Hypertensive disease		0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.28	(0.07, 0.45)	0.22	(0.05, 0.36)	0.00	(0.00, 0.00)	
Colon cancer		0.09	(0.05, 0.14)	0.10	(0.05, 0.14)	0.09	(0.05, 0.14)	0.09	(0.05, 0.13)	0.06	(0.03, 0.09)	
Kidney cancer		0.10	(0.07, 0.14)	0.11	(0.07, 0.14)	0.10	(0.07, 0.14)	0.10	(0.06, 0.13)	0.06	(0.04, 0.09)	
Pancreatic cancer		0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	
Diabetes mellitus		0.38	(0.30, 0.45)	0.38	(0.30, 0.46)	0.31	(0.23, 0.39)	0.22	(0.13, 0.31)	0.14	(0.08, 0.22)	

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Risk factor, disease	Age (years)										
	20–29	30–44	45–59	60–69	70–79	≥80					
<i>Alcohol use</i>											
Ischemic heart disease		-0.30 (-0.43, -0.16)	-0.30 (-0.45, -0.16)	-0.13 (-0.20, -0.07)	-0.04 (-0.07, -0.02)	-0.01 (-0.02, -0.01)					
Ischemic stroke		0.30 (0.09, 0.54)	0.14 (0.04, 0.28)	0.04 (0.01, 0.07)	0.01 (0.00, 0.01)	0.00 (0.00, 0.00)					
Hemorrhagic stroke		0.46 (0.11, 0.80)	0.22 (0.04, 0.47)	0.06 (0.01, 0.13)	0.01 (0.00, 0.03)	0.00 (0.00, 0.00)					
Hypertensive disease		0.44 (0.38, 0.52)	0.41 (0.35, 0.47)	0.34 (0.29, 0.39)	0.25 (0.21, 0.29)	0.16 (0.12, 0.20)					
Cardiac arrhythmias		0.37 (0.33, 0.42)	0.36 (0.32, 0.40)	0.33 (0.29, 0.37)	0.27 (0.23, 0.31)	0.20 (0.15, 0.24)					
Colon cancer		0.29 (0.23, 0.34)	0.28 (0.23, 0.34)	0.23 (0.17, 0.28)	0.16 (0.11, 0.20)	0.06 (0.03, 0.10)					
Esophagus cancer		0.56 (0.42, 0.67)	0.57 (0.44, 0.68)	0.51 (0.39, 0.64)	0.40 (0.27, 0.53)	0.20 (0.09, 0.32)					
Larynx cancer		0.58 (0.53, 0.64)	0.56 (0.51, 0.62)	0.51 (0.45, 0.56)	0.41 (0.36, 0.46)	0.29 (0.23, 0.35)					
Liver cancer		0.19 (0.08, 0.32)	0.19 (0.08, 0.31)	0.19 (0.07, 0.32)	0.23 (0.06, 0.38)	0.28 (0.06, 0.45)					
Mouth cancer		0.50 (0.41, 0.58)	0.45 (0.38, 0.53)	0.37 (0.31, 0.44)	0.27 (0.23, 0.33)	0.17 (0.13, 0.21)					
Pharynx cancer		0.50 (0.42, 0.58)	0.45 (0.38, 0.53)	0.37 (0.31, 0.43)	0.27 (0.23, 0.32)	0.17 (0.13, 0.22)					
Other selected cancers		0.16 (0.14, 0.19)	0.15 (0.13, 0.17)	0.11 (0.10, 0.13)	0.08 (0.07, 0.09)	0.05 (0.04, 0.06)					
Diabetes mellitus		-0.13 (-0.15, -0.11)	-0.11 (-0.13, -0.09)	-0.08 (-0.10, -0.07)	-0.04 (-0.05, -0.03)	-0.01 (-0.02, -0.01)					
Liver cirrhosis		0.77 (0.69, 0.84)	0.74 (0.65, 0.81)	0.66 (0.58, 0.74)	0.49 (0.40, 0.59)	0.24 (0.13, 0.36)					
Pancreatitis		0.37 (0.26, 0.51)	0.34 (0.24, 0.46)	0.28 (0.20, 0.36)	0.20 (0.14, 0.27)	0.13 (0.08, 0.18)					
Falls	0.09 (0.01, 0.24)	0.12 (0.01, 0.29)	0.10 (0.00, 0.24)	0.05 (0.00, 0.14)	0.02 (0.00, 0.07)	0.00 (0.00, 0.00)					
Homicide	0.09 (0.01, 0.21)	0.12 (0.01, 0.29)	0.10 (0.01, 0.23)	0.05 (0.00, 0.14)	0.02 (0.00, 0.07)	0.00 (0.00, 0.00)					
Road traffic accident	0.01 (0.00, 0.00)	0.01 (0.00, 0.00)	0.01 (0.00, 0.00)	0.01 (0.00, 0.00)	0.01 (0.00, 0.00)	0.01 (0.00, 0.00)					
Suicide	0.09 (0.00, 0.23)	0.12 (0.00, 0.27)	0.10 (0.01, 0.24)	0.05 (0.00, 0.14)	0.02 (0.00, 0.07)	0.00 (0.00, 0.00)					
<i>Tobacco smoking</i>											

Risk factor, disease	Age (years)										
	20–29	30–44	45–59	60–69	70–79	≥80					
Ischemic heart disease		0.00 (0.00, 0.99)	0.49 (0.34, 0.62)	0.38 (0.29, 0.47)	0.34 (0.19, 0.46)	0.00 (0.00, 0.00)					
Total stroke		0.00 (0.00, 0.90)	0.21 (0.09, 0.34)	0.09 (0.04, 0.14)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Aortic aneurysms and dissection		0.00 (0.00, 1.00)	0.65 (0.38, 0.82)	0.60 (0.42, 0.74)	0.61 (0.35, 0.79)	0.00 (0.00, 0.00)					
Bladder cancer		0.00 (0.00, 0.99)	0.74 (0.46, 0.87)	0.69 (0.43, 0.85)	0.70 (0.42, 0.85)	0.75 (0.51, 0.89)					
Esophagus cancer		0.00 (0.00, 0.98)	0.60 (0.41, 0.73)	0.55 (0.39, 0.69)	0.57 (0.40, 0.70)	0.63 (0.45, 0.75)					
Kidney cancer		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Leukemia		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Liver cancer		0.00 (0.00, 0.95)	0.34 (0.22, 0.47)	0.30 (0.20, 0.40)	0.31 (0.21, 0.40)	0.36 (0.25, 0.48)					
Lung cancer		0.00 (0.00, 0.99)	0.71 (0.61, 0.79)	0.66 (0.59, 0.73)	0.68 (0.60, 0.73)	0.73 (0.64, 0.80)					
Mouth cancer		0.00 (0.00, 0.97)	0.51 (0.23, 0.72)	0.46 (0.20, 0.68)	0.48 (0.17, 0.67)	0.54 (0.26, 0.73)					
Pancreatic cancer		0.00 (0.00, 0.94)	0.27 (0.11, 0.44)	0.23 (0.08, 0.38)	0.24 (0.08, 0.39)	0.29 (0.11, 0.45)					
Pharynx cancer		0.00 (0.00, 0.98)	0.51 (0.22, 0.72)	0.46 (0.20, 0.67)	0.48 (0.21, 0.68)	0.54 (0.24, 0.75)					
Stomach cancer		0.00 (0.00, 0.92)	0.25 (0.14, 0.37)	0.21 (0.12, 0.30)	0.22 (0.13, 0.30)	0.27 (0.16, 0.37)					
Chronic obstructive pulmonary disease		0.00 (0.00, 0.98)	0.57 (0.36, 0.75)	0.52 (0.31, 0.69)	0.53 (0.33, 0.70)	0.60 (0.39, 0.75)					
Asthma		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Lower respiratory tract infection		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
<i>Physical inactivity</i>											
Ischemic heart disease		0.28 (0.25, 0.32)	0.28 (0.25, 0.32)	0.31 (0.27, 0.34)	0.19 (0.15, 0.23)	0.17 (0.13, 0.22)					
Ischemic stroke		0.17 (0.10, 0.23)	0.17 (0.11, 0.24)	0.20 (0.13, 0.27)	0.09 (0.05, 0.14)	0.11 (0.03, 0.18)					
Colon cancer		0.24 (0.20, 0.27)	0.24 (0.20, 0.28)	0.27 (0.22, 0.31)	0.15 (0.11, 0.19)	0.13 (0.09, 0.17)					
Diabetes mellitus		0.19 (0.16, 0.22)	0.19 (0.16, 0.23)	0.21 (0.18, 0.25)	0.12 (0.08, 0.16)	0.09 (0.06, 0.12)					

Risk factor, disease	Age (years)									
	20–29	30–44	45–59	60–69	70–79	≥80				
<i>High TFA intake</i>										
Ischemic heart disease		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)
<i>Low PUFA intake</i>										
Ischemic heart disease		0.45 (0.01, 0.95)	0.35 (0.00, 0.93)	0.20 (-0.02, 0.72)	0.13 (0.00, 0.54)	0.10 (0.02, 0.17)				
<i>High dietary sodium intake</i>										
Ischemic heart disease		0.04 (0.03, 0.06)	0.04 (0.02, 0.06)	0.04 (0.03, 0.05)	0.02 (-0.01, 0.04)	0.02 (-0.01, 0.04)				
Total stroke		0.07 (0.05, 0.08)	0.09 (0.07, 0.10)	0.06 (0.04, 0.08)	0.06 (0.03, 0.08)	0.05 (0.03, 0.08)				
Hypertensive disease		0.24 (0.18, 0.32)	0.25 (0.19, 0.33)	0.27 (0.20, 0.34)	0.21 (0.16, 0.28)	0.17 (0.13, 0.22)				
Other selected CVD		0.13 (0.09, 0.17)	0.13 (0.10, 0.18)	0.14 (0.10, 0.19)	0.11 (0.08, 0.15)	0.09 (0.07, 0.11)				
Stomach cancer		0.24 (0.00, 0.44)	0.26 (0.00, 0.46)	0.27 (0.00, 0.47)	0.28 (-0.01, 0.48)	0.27 (-0.01, 0.47)				
<i>Low fruit and vegetable intake</i>										
Ischemic heart disease		0.16 (0.04, 0.26)	0.14 (0.04, 0.23)	0.09 (0.02, 0.16)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Ischemic stroke		0.23 (0.08, 0.36)	0.20 (0.05, 0.32)	0.14 (0.05, 0.23)	0.11 (0.00, 0.21)	0.00 (0.00, 0.00)				
Colon cancer		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Esophagus cancer		0.33 (0.03, 0.53)	0.28 (0.01, 0.50)	0.20 (0.00, 0.37)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Lung cancer		0.16 (0.04, 0.26)	0.14 (0.04, 0.23)	0.09 (0.02, 0.16)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Mouth cancer		0.33 (0.00, 0.54)	0.28 (0.01, 0.48)	0.20 (-0.01, 0.36)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Pharynx cancer		0.33 (0.01, 0.54)	0.28 (0.02, 0.49)	0.20 (0.00, 0.37)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Stomach cancer		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
<i>Hepatitis B virus</i>										
Liver cancer		0.40 (0.28, 0.52)	0.40 (0.28, 0.52)	0.40 (0.29, 0.52)	0.30 (0.18, 0.44)	0.30 (0.19, 0.44)				

Risk factor, disease	Age (years)										
	20–29	30–44	45–59	60–69	70–79	≥80					
<i>Hepatitis C virus</i>											
Liver cancer		0.18 (0.11, 0.27)	0.36 (0.24, 0.49)	0.48 (0.34, 0.62)	0.73 (0.62, 0.83)	0.78 (0.66, 0.86)					
<i>Helicobacter pylori</i>											
Stomach cancer		0.31 (0.18, 0.43)	0.47 (0.32, 0.61)	0.56 (0.39, 0.69)	0.58 (0.42, 0.71)	0.58 (0.42, 0.71)					
<i>HTLV-1</i>											
Adult T-cell leukemia		1.00	1.00	1.00	1.00	1.00					
<i>Joint risk</i>											
Ischemic heart disease		0.44 (0.32, 0.98)	0.59 (0.47, 0.70)	0.50 (0.42, 0.57)	0.39 (0.28, 0.51)	0.32 (0.18, 0.45)					
Ischemic stroke		0.40 (0.20, 0.95)	0.38 (0.20, 0.51)	0.24 (0.15, 0.33)	0.07 (0.03, 0.18)	0.00 (0.00, 0.00)					
Total stroke		0.41 (0.30, 0.93)	0.58 (0.50, 0.66)	0.52 (0.43, 0.61)	0.38 (0.24, 0.50)	0.40 (0.25, 0.52)					
Hypertensive disease		0.84 (0.68, 0.97)	0.94 (0.84, 0.99)	0.96 (0.88, 1.00)	0.89 (0.79, 0.98)	0.83 (0.72, 0.90)					
Other selected CVD		0.53 (0.40, 0.69)	0.68 (0.56, 0.83)	0.74 (0.62, 0.87)	0.63 (0.51, 0.77)	0.56 (0.47, 0.64)					

CVD, cardiovascular disease; HTLV-1, human T-lymphotropic virus1.

Values in parentheses indicate lower and upper bounds of 95% confidence intervals.

Table S9: Population-attributable fractions of cause-specific mortality attributable to individual risk factors in women in 2007.

Risk factor, disease	Age (years)										
	20–29		30–44		45–59		60–69		70–79		≥80
<i>High blood glucose</i>											
Ischemic heart disease		0.13	(0.00, 0.27)	0.22	(0.13, 0.31)	0.14	(0.04, 0.21)	0.14	(0.06, 0.22)	0.14	(0.06, 0.23)
Total stroke		0.12	(0.01, 0.24)	0.19	(0.01, 0.37)	0.18	(0.10, 0.26)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Diabetes mellitus		1.00		1.00		1.00		1.00		1.00	
<i>High LDL cholesterol</i>											
Ischemic heart disease		0.00	(0.00, 0.00)	0.35	(0.00, 0.57)	0.22	(0.09, 0.33)	0.19	(0.06, 0.29)	0.12	(0.04, 0.21)
Ischemic stroke		0.19	(0.00, 0.34)	0.30	(0.12, 0.46)	0.21	(0.10, 0.30)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
<i>High blood pressure</i>											
Ischemic heart disease		0.00	(0.00, 0.00)	0.19	(0.12, 0.25)	0.32	(0.24, 0.38)	0.18	(0.03, 0.31)	0.20	(0.02, 0.34)
Total stroke		0.00	(0.00, 0.00)	0.24	(0.16, 0.32)	0.32	(0.22, 0.40)	0.24	(0.15, 0.34)	0.28	(0.16, 0.40)
Hypertensive disease		0.00	(0.00, 0.00)	0.67	(0.51, 0.81)	0.85	(0.74, 0.93)	0.78	(0.66, 0.87)	0.75	(0.66, 0.84)
Other selected CVD		0.00	(0.00, 0.00)	0.42	(0.30, 0.55)	0.61	(0.48, 0.73)	0.52	(0.42, 0.64)	0.49	(0.41, 0.58)
<i>High body mass index</i>											
Ischemic heart disease		0.00	(0.00, 0.00)	0.09	(0.06, 0.12)	0.12	(0.08, 0.18)	0.09	(0.04, 0.14)	0.03	(0.00, 0.05)
Ischemic stroke		0.00	(0.00, 0.00)	0.10	(0.05, 0.15)	0.12	(0.06, 0.18)	0.09	(0.04, 0.15)	0.00	(0.00, 0.00)
Hypertensive disease		0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.21	(0.06, 0.34)	0.18	(0.05, 0.30)	0.00	(0.00, 0.00)
Postmenopausal breast cancer				0.04	(0.01, 0.07)	0.06	(0.00, 0.11)	0.06	(0.01, 0.11)	0.04	(0.01, 0.08)
Colon cancer		0.00	(0.00, 0.00)	0.03	(0.01, 0.06)	0.05	(0.02, 0.09)	0.05	(0.02, 0.09)	0.04	(0.01, 0.07)
Corpus uteri cancer		0.00	(0.00, 0.00)	0.10	(0.08, 0.12)	0.15	(0.12, 0.19)	0.16	(0.13, 0.19)	0.11	(0.07, 0.16)
Kidney cancer		0.00	(0.00, 0.00)	0.06	(0.05, 0.08)	0.10	(0.07, 0.13)	0.10	(0.08, 0.13)	0.07	(0.04, 0.11)

Risk factor, disease	Age (years)										
	20–29	30–44	45–59	60–69	70–79	≥80					
Pancreatic cancer		0.00 (0.00, 0.00)	0.03 (0.00, 0.05)	0.04 (0.01, 0.07)	0.04 (0.01, 0.07)	0.03 (0.01, 0.05)					
Diabetes mellitus		0.00 (0.00, 0.00)	0.19 (0.14, 0.24)	0.23 (0.16, 0.30)	0.18 (0.10, 0.25)	0.12 (0.07, 0.19)					
<i>Alcohol use</i>											
Ischemic heart disease		-0.16 (-0.22, -0.10)	-0.14 (-0.19, -0.08)	-0.04 (-0.06, -0.02)	-0.01 (-0.02, -0.01)	0.00 (0.00, 0.00)					
Ischemic stroke		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Hemorrhagic stroke		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Hypertensive disease		0.25 (0.22, 0.29)	0.20 (0.17, 0.23)	0.13 (0.11, 0.16)	0.08 (0.06, 0.10)	0.05 (0.03, 0.07)					
Cardiac arrhythmias		0.30 (0.26, 0.33)	0.24 (0.21, 0.28)	0.16 (0.13, 0.19)	0.09 (0.07, 0.12)	0.06 (0.04, 0.08)					
Breast cancer		0.08 (0.02, 0.16)	0.08 (0.01, 0.15)	0.06 (0.01, 0.12)	0.03 (0.01, 0.06)	0.04 (0.01, 0.09)					
Colon cancer		0.10 (0.02, 0.18)	0.07 (0.01, 0.14)	0.04 (0.01, 0.08)	0.01 (0.00, 0.02)	0.01 (0.00, 0.02)					
Esophagus cancer		0.31 (0.21, 0.42)	0.23 (0.15, 0.34)	0.13 (0.07, 0.20)	0.04 (0.01, 0.08)	0.02 (0.00, 0.05)					
Larynx cancer		0.50 (0.44, 0.57)	0.42 (0.36, 0.48)	0.30 (0.25, 0.35)	0.17 (0.13, 0.21)	0.10 (0.06, 0.14)					
Liver cancer		0.33 (0.05, 0.66)	0.26 (0.03, 0.57)	0.15 (0.01, 0.39)	0.04 (0.00, 0.15)	0.02 (0.00, 0.11)					
Mouth cancer		0.39 (0.32, 0.47)	0.30 (0.24, 0.37)	0.19 (0.15, 0.24)	0.09 (0.07, 0.13)	0.05 (0.03, 0.07)					
Pharynx cancer		0.39 (0.32, 0.47)	0.30 (0.24, 0.37)	0.19 (0.15, 0.25)	0.09 (0.07, 0.13)	0.05 (0.03, 0.07)					
Other selected cancers		0.12 (0.10, 0.14)	0.08 (0.07, 0.10)	0.05 (0.04, 0.06)	0.02 (0.02, 0.03)	0.01 (0.01, 0.02)					
Diabetes mellitus		-0.03 (-0.03, -0.02)	-0.03 (-0.03, -0.02)	-0.02 (-0.02, -0.01)	-0.01 (-0.02, -0.01)	-0.01 (-0.01, -0.01)					
Liver cirrhosis		0.72 (0.64, 0.80)	0.62 (0.54, 0.71)	0.48 (0.38, 0.58)	0.23 (0.15, 0.33)	0.10 (0.03, 0.20)					
Pancreatitis		0.21 (0.14, 0.29)	0.17 (0.11, 0.22)	0.11 (0.07, 0.15)	0.06 (0.04, 0.09)	0.04 (0.02, 0.06)					
Falls	0.02 (0.00, 0.06)	0.03 (0.00, 0.08)	0.01 (0.00, 0.05)	0.00 (0.00, 0.02)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Homicide	0.02 (0.00, 0.06)	0.03 (0.00, 0.08)	0.01 (0.00, 0.04)	0.00 (0.00, 0.02)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					

Risk factor, disease	Age (years)											
	20–29		30–44		45–59		60–69		70–79		≥80	
Road traffic accident	0.01	(0.00, 0.00)	0.01	(0.00, 0.00)	0.01	(0.00, 0.00)	0.01	(0.00, 0.00)	0.01	(0.00, 0.00)	0.01	(0.00, 0.00)
Suicide	0.02	(0.00, 0.06)	0.03	(0.00, 0.08)	0.01	(0.00, 0.05)	0.00	(0.00, 0.02)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
<i>Tobacco smoking</i>												
Ischemic heart disease			0.00	(0.00, 0.00)	0.27	(0.09, 0.49)	0.33	(0.14, 0.66)	0.19	(0.09, 0.34)	0.13	(0.02, 0.32)
Total stroke			0.00	(0.00, 0.87)	0.16	(0.05, 0.33)	0.13	(0.05, 0.36)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Aortic aneurysms and dissection			0.00	(0.00, 0.00)	0.13	(0.01, 0.38)	0.24	(0.06, 0.57)	0.21	(0.02, 0.48)	0.14	(0.01, 0.44)
Bladder cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Cervix uteri cancer			0.00	(0.00, 0.86)	0.13	(0.02, 0.31)	0.24	(0.05, 0.59)	0.20	(0.05, 0.43)	0.23	(0.06, 0.49)
Esophagus cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Kidney cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Leukemia			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Liver cancer			0.00	(0.00, 0.76)	0.07	(0.01, 0.20)	0.15	(0.03, 0.41)	0.12	(0.04, 0.27)	0.14	(0.04, 0.32)
Lung cancer			0.00	(0.00, 0.92)	0.24	(0.09, 0.44)	0.40	(0.20, 0.70)	0.36	(0.24, 0.52)	0.39	(0.25, 0.62)
Mouth cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Pancreatic cancer			0.00	(0.00, 0.78)	0.08	(0.02, 0.22)	0.16	(0.04, 0.45)	0.13	(0.04, 0.27)	0.15	(0.06, 0.36)
Pharynx cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Stomach cancer			0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)	0.00	(0.00, 0.00)
Chronic obstructive pulmonary disease			0.00	(0.00, 0.92)	0.22	(0.04, 0.53)	0.37	(0.08, 0.76)	0.33	(0.09, 0.64)	0.36	(0.10, 0.70)
Asthma			0.00	(0.00, 0.93)	0.21	(0.05, 0.51)	0.36	(0.12, 0.70)	0.32	(0.13, 0.58)	0.36	(0.13, 0.65)
Lower respiratory tract infection			0.00	(0.00, 0.65)	0.04	(0.00, 0.14)	0.08	(0.00, 0.28)	0.07	(0.00, 0.17)	0.08	(0.00, 0.22)
<i>Physical inactivity</i>												

Risk factor, disease	Age (years)									
	20–29	30–44	45–59	60–69	70–79	≥80				
Ischemic heart disease		0.27 (0.24, 0.31)	0.26 (0.22, 0.29)	0.27 (0.23, 0.31)	0.18 (0.14, 0.22)	0.18 (0.13, 0.22)				
Ischemic stroke		0.16 (0.10, 0.22)	0.15 (0.09, 0.20)	0.16 (0.09, 0.22)	0.08 (0.04, 0.13)	0.12 (0.04, 0.20)				
Breast cancer		0.11 (0.08, 0.14)	0.13 (0.10, 0.15)	0.13 (0.11, 0.16)	0.08 (0.06, 0.11)	0.08 (0.06, 0.11)				
Colon cancer		0.23 (0.19, 0.26)	0.21 (0.17, 0.25)	0.22 (0.18, 0.26)	0.14 (0.10, 0.17)	0.15 (0.10, 0.19)				
Diabetes mellitus		0.19 (0.15, 0.22)	0.17 (0.14, 0.21)	0.18 (0.15, 0.22)	0.12 (0.08, 0.16)	0.10 (0.07, 0.14)				
<i>High TFA intake</i>										
Ischemic heart disease		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
<i>Low PUFA intake</i>										
Ischemic heart disease		0.43 (-0.01, 0.94)	0.33 (-0.02, 0.86)	0.19 (-0.01, 0.64)	0.12 (0.00, 0.46)	0.10 (0.03, 0.16)				
<i>High dietary sodium intake</i>										
Ischemic heart disease		0.09 (0.06, 0.11)	0.05 (0.03, 0.07)	0.06 (0.05, 0.08)	0.03 (0.01, 0.05)	0.04 (0.01, 0.07)				
Total stroke		0.06 (0.05, 0.08)	0.06 (0.05, 0.08)	0.06 (0.04, 0.08)	0.04 (0.02, 0.06)	0.05 (0.03, 0.07)				
Hypertensive disease		0.24 (0.18, 0.32)	0.24 (0.18, 0.32)	0.27 (0.20, 0.34)	0.20 (0.15, 0.27)	0.20 (0.15, 0.25)				
Other selected CVD		0.13 (0.09, 0.17)	0.13 (0.09, 0.17)	0.14 (0.10, 0.19)	0.10 (0.08, 0.14)	0.10 (0.08, 0.13)				
Stomach cancer		0.24 (-0.02, 0.44)	0.27 (0.00, 0.46)	0.27 (-0.01, 0.48)	0.29 (-0.01, 0.47)	0.28 (-0.03, 0.48)				
<i>Low fruit and vegetable intake</i>										
Ischemic heart disease		0.14 (0.03, 0.23)	0.08 (0.02, 0.15)	0.04 (0.01, 0.08)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Ischemic stroke		0.20 (0.06, 0.31)	0.12 (0.04, 0.20)	0.07 (0.02, 0.11)	0.06 (0.00, 0.12)	0.00 (0.00, 0.00)				
Colon cancer		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Esophagus cancer		0.28 (0.02, 0.48)	0.18 (0.01, 0.32)	0.10 (0.00, 0.19)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				
Lung cancer		0.14 (0.03, 0.23)	0.08 (0.02, 0.15)	0.04 (0.01, 0.08)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)				

Risk factor, disease	Age (years)										
	20–29	30–44	45–59	60–69	70–79	≥80					
Mouth cancer		0.28 (0.01, 0.48)	0.18 (0.02, 0.32)	0.10 (0.00, 0.19)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Pharynx cancer		0.28 (0.04, 0.49)	0.18 (0.01, 0.32)	0.10 (0.01, 0.19)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
Stomach cancer		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)					
<i>Hepatitis B virus</i>											
Liver cancer		0.28 (0.19, 0.40)	0.28 (0.19, 0.41)	0.28 (0.19, 0.40)	0.30 (0.19, 0.43)	0.30 (0.19, 0.43)					
<i>Hepatitis C virus</i>											
Liver cancer		0.12 (0.07, 0.20)	0.36 (0.25, 0.50)	0.55 (0.41, 0.68)	0.71 (0.58, 0.81)	0.73 (0.61, 0.84)					
<i>Helicobacter pylori</i>											
Stomach cancer		0.31 (0.19, 0.43)	0.47 (0.31, 0.61)	0.56 (0.38, 0.68)	0.58 (0.42, 0.70)	0.58 (0.43, 0.70)					
<i>Human papilloma virus</i>											
Cervix uteri cancer		1.00	1.00	1.00	1.00	1.00					
<i>HTLV-1</i>											
Adult T-cell leukemia		1.00	1.00	1.00	1.00	1.00					
<i>Joint risk</i>											
Ischemic heart disease		0.32 (0.22, 0.56)	0.59 (0.46, 0.72)	0.55 (0.47, 0.61)	0.44 (0.31, 0.54)	0.40 (0.27, 0.53)					
Ischemic stroke		0.26 (0.09, 0.42)	0.36 (0.20, 0.51)	0.28 (0.18, 0.36)	0.06 (0.02, 0.12)	0.00 (0.00, 0.00)					
Total stroke		0.22 (0.12, 0.49)	0.46 (0.32, 0.71)	0.47 (0.39, 0.55)	0.28 (0.17, 0.39)	0.32 (0.19, 0.44)					
Hypertensive disease		0.56 (0.35, 0.82)	0.94 (0.79, 0.99)	0.93 (0.84, 0.98)	0.85 (0.74, 0.94)	0.81 (0.72, 0.89)					
Other selected CVD		0.26 (0.17, 0.37)	0.63 (0.47, 0.79)	0.68 (0.57, 0.80)	0.58 (0.47, 0.70)	0.55 (0.48, 0.64)					

CVD, cardiovascular disease; HTLV-1, human T-lymphotropic virus1.

Values in parentheses indicate lower and upper bounds of 95% confidence intervals.

Japan: Universal Health Care at 50 Years 1

What has made the population of Japan healthy?

Nayu Ikeda, Eiko Saito, Naoki Kondo, Manami Inoue, Shunya Ikeda, Toshihiko Satoh, Koji Wada, Andrew Stickley, Kota Katanoda, Tetsuya Mizoue, Mitsuhiro Noda, Hiroyasu Iso, Yoshihisa Fujino, Tomotaka Sobue, Shoichiro Tsugane, Mohsen Naghavi, Majid Ezzati, Kenji Shibuya

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People in Japan have the longest life expectancy at birth in the world. Here, we compile the best available evidence about population health in Japan to investigate what has made the Japanese people healthy in the past 50 years. The Japanese population achieved longevity in a fairly short time through a rapid reduction in mortality rates for communicable diseases from the 1950s to the early 1960s, followed by a large reduction in stroke mortality rates. Japan had moderate mortality rates for non-communicable diseases, with the exception of stroke, in the 1950s. The improvement in population health continued after the mid-1960s through the implementation of primary and secondary preventive community public health measures for adult mortality from non-communicable diseases and an increased use of advanced medical technologies through the universal insurance scheme. Reduction in health inequalities with improved average population health was partly attributable to equal educational opportunities and financial access to care. With the achievement of success during the health transition since World War 2, Japan now needs to tackle major health challenges that are emanating from a rapidly ageing population, causes that are not amenable to health technologies, and the effects of increasing social disparities to sustain the improvement in population health.

Introduction

Japan has caught the attention of the rest of the world because of the tremendous success it has achieved in improving the health status of its population in the 20th century. The improving health status of the Japanese population was noted as early as the 1920s when infant

mortality rates started to fall.¹ Increased child survival rates were partly possible then through the enhanced education and increasing literacy of mothers—in the early 20th century, with the provision of free compulsory education, almost all girls attended primary schools.² However, after World War 2, Japan showed its strength in improving the health of its population. The country was devastated after its defeat. Per person gross domestic product was roughly international \$3400 in 1950 (table), which is similar to that in India today (Gakidou E, Institute for Health Metrics and Evaluation, personal communication). The health status of the population was also poor—in 1947, male life expectancy in Japan at birth was only 50 years and female life expectancy was 54 years.⁵

Rapid economic growth started in the late 1950s and life expectancy started to increase at an unprecedented rate. Within a few decades Japan had caught up with and eventually surpassed many other developed nations (figure 1; figure 2). Since 1986, Japan has ranked first in terms of female life expectancy at birth, with the highest ever recorded worldwide life expectancy of 86 years in 2009.⁹ The country had also maintained the best healthy life expectancy at birth in 2007 (73 years for men and 78 years for women).¹⁰ With a low rate of total fertility, the proportion of people aged 65 years and older has quadrupled during the past 60 years to 23% in 2010,⁴ making the Japanese people the oldest population in the world. Despite the ageing population, Japan's health expenditure is only 8·5% of gross domestic product, which put it in 20th position in terms of expenditure among the countries of the Organisation for Economic Co-operation and Development in 2008.⁶

What has made the population of Japan healthy? How has Japan achieved the longest life expectancy at birth worldwide? Will the Japanese population continue to be

Key messages

- The early establishment of free compulsory primary education and a social insurance system before World War 2 and universal health insurance coverage in 1961 enabled the provision of equal opportunities for health promotion.
- Disparities in health across regions and socioeconomic groups are fairly small in this homogeneous and egalitarian society and have narrowed over time with increased average population health. However, the downward trend in socioeconomic inequality in health has been less obvious since the 1990s, which has coincided with income inequality gradually increasing.
- Japanese life expectancy at birth increased rapidly in the 1950s and early 1960s as a result of decreased mortality rates for communicable diseases in children and young adults, which was largely attributable to the government's strong stewardship in investing in key interventions for public health.
- Stroke mortality reduction was one of the major drivers of the sustained extension of Japanese longevity after the mid-1960s. The control of blood pressure improved through population-based interventions such as salt reduction campaigns and an increased use of cost-effective health technologies such as antihypertensive drugs under universal health insurance coverage.
- Further progress in Japan's longevity primarily depends on prevention of major risk factors for non-communicable diseases such as tobacco smoking and high blood pressure and several cardiovascular risks. Prevention of premature mortality from suicide is also a major challenge for population health.
- A rapidly ageing population as a result of improved survival is challenging Japan's health system in terms of its financing and quality of care. An effective link between medical and long-term care through both top-down and bottom-up approaches is necessary to enhance the welfare of the population throughout the country.