## **Supplemental Online Content**

Urashima M, Tanaka E, Ishihara H, Akutsu T. Association between life expectancy at age 60 years before the COVID-19 pandemic and excess mortality during the pandemic in aging countries. *JAMA Netw Open*. 2022;5(10):e2237528. doi:10.1001/jamanetworkopen.2022.37528

eTable. Definitions and Descriptions of Covariates

This supplemental material has been provided by the authors to give readers additional information about their work.

	eTable 1	. Definitions	and Descri	ptions of	Covariates
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Covariates	Definition / Description / Information source	Years	URL	Access
				day
Ratio of aging population				
Population ≥ 60 years of age	United Nations Population Division, New York, World	2019	https://data.un.org/_Docs/SYB/CSV/	2020/05
(%)	Population Prospects: The 2019 Revision; supplemented		SYB62_1_201907_Population,%20S	/22
	by data from the United Nations Statistics Division, New		urface%20Area%20and%20Density.	
	York, Demographic Yearbook 2015 and Secretariat for the		<u>csv</u>	
	Pacific			
Vaccine				
Fully vaccinated population	People fully vaccinated (%) in each country at the end of	2021/1	https://ourworldindata.org/explorers/c	2022/6/
(%)	2021.	2/30	oronavirus-data-	14
			explorer?zoomToSelection=true&tim	
			e=2020-03-	
			01latest&facet=none&pickerSort=as	
			c&pickerMetric=location&Metric=Con	
			firmed+cases&Interval=7-	
			day+rolling+average&Relative+to+Po	
			pulation=true&Color+by+test+positivit	
			y=false&country=USA~GBR~CAN~D	
			EU~ITA~IND	

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Life expectancy				
Life expectancy at birth	Average number of years that a newborn could expect to	2016	https://www.who.int/data/gho/data/ind	2020/05
(years)	live, if he or she were to pass through life exposed to the		icators/indicator-details/GHO/life-	/22
	sex- and age-specific death rates prevailing at the time of		expectancy-at-birth-(years)	
	his or her birth, for a specific year, in a given country,			
	territory or geographic area.			
Life expectancy at age 60	Average number of years that a person aged 60 years old	2016	https://www.who.int/data/gho/data/ind	2020/05
(years)	could expect to live, if he or she were to pass through life		icators/indicator-details/GHO/life-	/22
	exposed to the sex- and age-specific death rates		expectancy-at-age-60-(years)	
	prevailing at the time of his or her 60 years, for a specific			
	year, in a given country, territory, or geographic area.			
Healthy life expectancy at	Average number of years that a person can expect to live	2016	https://www.who.int/data/gho/data/ind	2020/05
birth (years)	in "full health" by taking into account years lived in less		icators/indicator-details/GHO/healthy-	/22
	than full health due to disease and/or injury.		life-expectancy-(hale)-at-birth-(years)	
Healthy life expectancy at	Average number of years in full health a person (usually	2016	https://www.who.int/data/gho/data/ind	2020/05
age 60 (years)	at age 60) can expect to live based on current rates of ill-		icators/indicator-details/GHO/healthy-	/22
	health and mortality. Disaggregated by gender.		life-expectancy-(hale)-at-age-60-	
			(years)	

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Life-style				
Prevalence of obesity among	Percentage of defined population with a body mass index	2016	https://www.who.int/data/gho/data/ind	2020/05
adults, BMI ≥ 25 (%)	(BMI) of 25 kg/m <sup>2</sup> or higher.		icators/indicator-	/22
			details/GHO/prevalence-of-	
			overweight-among-adults-bmi-	
			greaterequal-25-(crude-estimate)-(-)	
Prevalence of obesity among	Percentage of defined population with a body mass index	2016	https://www.who.int/data/gho/data/ind	2020/05
adults, BMI ≥ 30 (%)	(BMI) of 30 kg/m <sup>2</sup> or higher.		icators/indicator-	/22
			details/GHO/prevalence-of-obesity-	
			among-adults-bmi-=-30-(crude-	
			estimate)-(-)	
Alcohol drinking, total per	Total APC is defined as the total (sum of three-year	2016	https://www.who.int/data/gho/data/ind	2020/05
capita consumption (APC) (in	average recorded and unrecorded APC, adjusted for		icators/indicator-details/GHO/alcohol-	/22
liters of pure alcohol)	tourist consumption) amount of alcohol consumed per		total-per-capita-(15-years)-	
	adult (15+ years) over a calendar year, in liters of pure		consumption-(in-litres-of-pure-	
	alcohol. Recorded alcohol consumption refers to official		alcohol)	
	statistics (production, import, export, and sales or taxation			
	data), while the unrecorded alcohol consumption refers to			
	alcohol that is not taxed and is outside the usual system of			
	governmental control. Tourist consumption takes into			
	account tourists visiting the country and inhabitants			

	visiting other countries. Positive figures denote alcohol			
	consumption of outbound tourists being greater than			
	alcohol consumption by inbound tourists, and negative			
	numbers the opposite. Tourist consumption is based on			
	UN tourist statistics.			
Prevalence of smoking any	Percentage of the population aged 15 years and above	2015	https://www.who.int/data/gho/data/ind	2020/05
tobacco product among	who currently use any tobacco product (smoked and/or		icators/indicator-	/22
males aged ≥15 years (%)	smokeless tobacco) on a daily or non-daily basis. Note		details/GHO/prevalence-of-smoking-	
	that most countries collect data about smoking, but not		any-tobacco-product-among-	
	smokeless tobacco use, leaving gaps in tobacco use data,		persons-aged-=-15-years	
	which prevent global and regional summaries of tobacco			
	use rates. Until data improve, the estimates will reflect the			
	percentage of the population aged 15 years and over who			
	currently smoke.			
Prevalence of smoking any	Percentage of the population aged 15 years and above	2015	https://www.who.int/data/gho/data/ind	2020/05
tobacco product among	who currently use any tobacco product (smoked and/or		icators/indicator-	/22
females aged ≥ 15 years (%)	smokeless tobacco) on a daily or non-daily basis. Note		details/GHO/prevalence-of-smoking-	
	that most countries collect data about smoking, but not		any-tobacco-product-among-	
	smokeless tobacco use, leaving gaps in tobacco use data,		persons-aged-=-15-years	
	which prevent global and regional summaries of tobacco			
	use rates. Until data improve, the estimates will reflect the			
	percentage of the population aged 15 years and over who			
	currently smoke.			

Prevalence of insufficient	Percent of defined population attaining less than 150	2016	https://www.who.int/data/gho/data/ind	2020/05
physical activity among	minutes of moderate-intensity physical activity per week,		icators/indicator-	/22
adults aged ≥ 18 years (%)	or less than 75 minutes of vigorous-intensity physical		details/GHO/prevalence-of-	
	activity per week, or the equivalent.		insufficient-physical-activity-among-	
			adults-aged-18-years-(crude-	
			estimate)-(-)	
Life-style disease				
prevalence				
Prevalence of high blood	Percent of the defined population with high blood	2015	https://www.who.int/data/gho/data/ind	2020/05
pressure (systolic ≥140 or	pressure (systolic blood pressure ≥ 140 OR diastolic blood		icators/indicator-details/GHO/raised-	/22
diastolic ≥90 mmHg) (%)	pressure ≥ 90).		blood-pressure-(sbp-=140-or-dbp-	
			=90)-(crude-estimate)	
Prevalence of high fasting	Percent of the defined population with fasting glucose	2014	https://www.who.int/data/gho/data/ind	2020/05
blood glucose (≥7.0 mmol/L	≥126 mg/dL (7.0 mmol/L) or history of diagnosis of		icators/indicator-details/GHO/raised-	/22
or on medication) (%)	diabetes or use of insulin or oral hypoglycemic drugs.		fasting-blood-glucose-(-=-7-0-mmol-l-	
			or-on-medication)-(crude-estimate)	
Prevalence of increased total	Percentage of defined population with total cholesterol ≥	2008	https://www.who.int/data/gho/data/ind	2020/05
cholesterol (≥5.0 mmol/L)	190 mg/dL (5.0 mmol/L).		icators/indicator-details/GHO/raised-	/22
(%)			total-cholesterol-(-=-5-0-mmol-l)-	
			(crude-estimate)	

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Death due to life-style				
diseases				
Death due to chronic	This parameter was calculated by the number of death due	2016	https://www.who.int/data/gho/data/ind	2020/05
obstructive pulmonary	to chronic obstructive pulmonary disease in adults		icators/indicator-	/22
disease (%)	(estimated above 25 years) per 100,000 population.		details/GHO/ambient-and-household-	
			air-pollution-attributable-death-rate-	
			(per-100-000-population)	
Death due to ischemic heart	This parameter was calculated by the number of death	2016	https://www.who.int/data/gho/data/ind	2020/05
disease (%)	due to ischemic heart diseases in adults (estimated above		icators/indicator-	/22
	25 years) per 100,000 population. in adults (estimated		details/GHO/ambient-and-household-	
	above 25 years)		air-pollution-attributable-death-rate-	
			(per-100-000-population)	
Death due to lower	This parameter was calculated by the number of death	2016	https://www.who.int/data/gho/data/ind	2020/05
respiratory infections (%)	due to acute respiratory infections (estimated for all ages)		icators/indicator-	/22
	per 100,000 population.		details/GHO/ambient-and-household-	
			air-pollution-attributable-death-rate-	
			(per-100-000-population)	

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Death due to stroke (%)	This parameter was calculated by the number of death	2016	https://www.who.int/data/gho/data/ind	2020/05
	due to cerebrovascular diseases in adults (estimated		icators/indicator-	/22
	above 25 years) per 100,000 population.		details/GHO/ambient-and-household-	
			air-pollution-attributable-death-rate-	
			(per-100-000-population)	
Death due to tracheal,	This parameter was calculated by the number of death	2016	https://www.who.int/data/gho/data/ind	2020/05
bronchial and lung cancers	due to lung cancer in adults (estimated above 25 years)		icators/indicator-	/22
(%)	per 100,000 population.		details/GHO/ambient-and-household-	
			air-pollution-attributable-death-rate-	
			(per-100-000-population)	
Ambient and household air	This parameter was calculated by the number of total	2016	https://www.who.int/data/gho/data/ind	2020/05
pollution attributable death	death due to chronic obstructive pulmonary disease,		icators/indicator-	/22
rate (n per 100,000	ischemic heart diseases, cerebrovascular diseases, and		details/GHO/ambient-and-household-	
population)	lung cancer in adults (estimated above 25 years) as well		air-pollution-attributable-death-rate-	
	as acute respiratory infections (estimated for all ages) per		(per-100-000-population)	
	100,000 population			
Annual mean concentration	Mean annual concentration of fine suspended particles of	2016	https://www.who.int/data/gho/data/ind	2020/05
of particulate matter less	less than 2.5 microns diameter is a common measure of		icators/indicator-	/22
than 2.5 microns in diameter	air pollution. The mean is a population-weighted average		details/GHO/concentrations-of-fine-	
(PM2.5)	for urban population in a country.		particulate-matter-(pm2-5)	

Definition / Description / Information source	Years	URL	Access
			day
Number of deaths during the first 28 completed days of	2018	https://www.who.int/data/gho/data/ind	2020/05
life per 1000 live births in a given year or other periods.		icators/indicator-	/22
Neonatal deaths (deaths among live births during the first		details/GHO/neonatal-mortality-rate-	
28 completed days of life) can be subdivided into early		(per-1000-live-births)	
neonatal deaths, occurring during the first 7 days of life,			
and late neonatal deaths, occurring after the 7th day but			
before the 28th completed day of life.			
Probability of a child born in a specific year or period dying	2018	https://www.who.int/data/gho/data/ind	2020/05
before reaching the age of five, if subject to age-specific		icators/indicator-details/GHO/under-	/22
mortality rates of that period. Under-five mortality rate as		five-mortality-rate-(probability-of-	
defined here is strictly speaking not a rate (i.e. the number		dying-by-age-5-per-1000-live-births)	
of deaths divided by the number of population at risk			
during a certain period of time), but the probability of			
death derived from a life table and expressed as rate per			
1000 live births.			
	Definition / Description / Information source     Number of deaths during the first 28 completed days of     life per 1000 live births in a given year or other periods.     Neonatal deaths (deaths among live births during the first     28 completed days of life) can be subdivided into early     neonatal deaths, occurring during the first 7 days of life,     and late neonatal deaths, occurring after the 7th day but     before the 28th completed day of life.     Probability of a child born in a specific year or period dying     before reaching the age of five, if subject to age-specific     mortality rates of that period. Under-five mortality rate as     defined here is strictly speaking not a rate (i.e. the number     of deaths divided by the number of population at risk     during a certain period of time), but the probability of     death derived from a life table and expressed as rate per     1000 live births.	Definition / Description / Information sourceYearsImage: Problem 1000 like births during the first 28 completed days of life per 1000 like births in a given year or other periods. Neonatal deaths (deaths among like births during the first 28 completed days of life) can be subdivided into early neonatal deaths, occurring during the first 7 days of life, and late neonatal deaths, occurring after the 7th day but before the 28th completed day of life.2018Probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. Under-five mortality rate as defined here is strictly speaking not a rate (i.e. the number of deaths divided by the number of population at risk during a certain period of time), but the probability of death derived from a life table and expressed as rate per 1000 live births.2018	Definition / Description / Information source Years URL   Number of deaths during the first 28 completed days of 2018 https://www.who.int/data/gho/data/ind   Number of deaths during the first 28 completed days of 2018 https://www.who.int/data/gho/data/ind   Neonatal deaths (deaths among live births during the first 2018 https://www.who.int/data/gho/data/ind   28 completed days of life) can be subdivided into early (per-1000-live-births) (per-1000-live-births)   neonatal deaths, occurring during the first 7 days of life, (per-1000-live-births) (per-1000-live-births)   Probability of a child born in a specific year or period dying 2018 https://www.who.int/data/gho/data/ind   pefore reaching the age of five, if subject to age-specific mortality rates of that period. Under-five mortality rate as 2018 https://www.who.int/data/gho/data/ind   of deaths divided by the number of population at risk uring a certain period of time), but the probability of during a certain period of time), but the probability of Https://www.who.int/data/gho/data/ind   1000 live births. life table and expressed as rate per life table and expressed as rate per life table and expressed as rate per   1000 live births. life table and expressed as rate per life table life table

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Under-five mortality rate	Probability of a child born in a specific year or period dying	2018	https://www.who.int/data/gho/data/ind	2020/05
(probability of dying by age 5	before reaching the age of five, if subject to age-specific		icators/indicator-details/GHO/under-	/22
per 1000 live births)	mortality rates of that period. Under-five mortality rate as		five-mortality-rate-(probability-of-	
	defined here is strictly speaking not a rate (i.e. the number		dying-by-age-5-per-1000-live-births)	
	of deaths divided by the number of population at risk			
	during a certain period of time), but a probability of death			
	derived from a life table and expressed as rate per 1000			
	live births.			
Mortality rate for 5-14 years	Probability that a child aged 5 dies before reaching his/her	2018	https://www.who.int/data/gho/data/ind	2020/05
of age (probability of dying	15th birthday.		icators/indicator-	/22
per 1000 children aged 5-14			details/GHO/mortality-rate-for-5-14-	
years)			year-olds-(probability-of-dying-per-	
			1000-children-aged-5-14-years)	
Adult mortality rate	Probability that a 15-year-old person will die before	2016	https://www.who.int/data/gho/data/ind	2020/05
(probability of dying between	reaching his/her 60th birthday. The probability of dying		icators/indicator-details/GHO/adult-	/22
15 and 60 years of age per	between the ages of 15 and 60 years (per 1 000		mortality-rate-(probability-of-dying-	
1000 population)	population) per year among a hypothetical cohort of		between-15-and-60-years-per-1000-	
	100,000 people that would experience the age-specific		population)	
	mortality rate of the reporting year.			

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Probability of dying between	Per cent of 30-year-old-people who would die before their	2016	https://www.who.int/data/gho/data/ind	2020/05
age 30 and exact age 70	70th birthday from any of cardiovascular disease, cancer,		icators/indicator-	/22
from any of cardiovascular	diabetes, or chronic respiratory diseases, assuming that		details/GHO/probability-(-)-of-dying-	
disease, cancer, diabetes, or	she/he would experience current mortality rates at every		between-age-30-and-exact-age-70-	
chronic respiratory diseases	age and she/he would not die from any other cause of		from-any-of-cardiovascular-disease-	
	death (e.g., injuries or HIV/AIDS).		cancer-diabetes-or-chronic-	
			respiratory-disease	
Population and dynamics				
Population (in million)	Elaboration of data by United Nations, Department of	2020	https://www.worldometers.info/world-	2020/05
	Economic and Social Affairs, Population Division. World		population/population-by-country/	/22
	Population Prospects: The 2019 Revision (Medium-fertility			
	variant).			

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Yearly change in population	Elaboration of data by United Nations, Department of	2020	https://www.worldometers.info/world-	2020/05
(x 10 <sup>-4</sup> %)	Economic and Social Affairs, Population Division. World		population/population-by-country/	/22
Net change in population (n x	Population Prospects: The 2019 Revision (Medium-fertility			
10 <sup>-3</sup> )	variant).			
Density (km <sup>2</sup> )				
Land area (km <sup>2</sup> x 10 <sup>3</sup> )				
Migrants, net (n x 10 <sup>3</sup> )				
Fertility rate (n)				
Median age (years old)				
Urban population percentage				
(%)				

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Economics				
Gross domestic product	United Nations Statistics Division, New York, National	2017	https://data.un.org/_Docs/SYB/CSV/	2020/05
(GDP) (billions of USD)	Accounts Statistics: Analysis of Main Aggregates (AMA)		<u>SYB62_230_201904_GDP%20and%</u>	/22
	database, last accessed February 2018.		20GDP%20Per%20Capita.csv	
GDP per capita (USD 1000)	United Nations Statistics Division, New York, National	2017	https://data.un.org/_Docs/SYB/CSV/	2020/05
	Accounts Statistics: Analysis of Main Aggregates (AMA)	2019	SYB62_230_201904_GDP%20and%	/22
Total unemployment (%)	database, last accessed February 2018.		20GDP%20Per%20Capita.csv	2020/05
	International Labour Organization (ILO), Geneva, Key		https://data.un.org/_Docs/SYB/CSV/	/22
	Indicators of the Labour Market (KILM 9th edition) and the		SYB62_329_201904_Labour%20For	
	ILOSTAT database, last accessed January 2019.		ce%20and%20Unemployment.csv	
Male unemployment (%)	International Labour Organization (ILO), Geneva, Key	2019	https://data.un.org/_Docs/SYB/CSV/	2020/05
	Indicators of the Labour Market (KILM 9th edition) and the		SYB62_329_201904_Labour%20For	/22
Female unemployment (%)	ILOSTAT database, last accessed January 2019.		ce%20and%20Unemployment.csv	
Labor force total participation				
(%)				
Labor force male				
participation (%)				
Labor force female				
participation (%)				

Covariates	Definition / Description / Information source	Years	URL	Access
				day
National Health policy				
International health regulation	Percentage of attributes of 13 core capacities that have	2014-	https://www.who.int/data/gho/data/ind	2020/05
(IHR) score (%)	been attained at a specific point in time. The 13 core	2019	icators/indicator-details/GHO/-	/22
	capacities are: (1) National legislation, policy and financing;		average-of-13-international-health-	
	(2) Coordination and National Focal Point communications;		regulations-core-capacity-scores-1st-	
	(3) Surveillance; (4) Response; (5) Preparedness; (6) Risk		version-of-the-questionnaire	
	communication; (7) Human resources; (8) Laboratory; (9)			
	Points of entry; (10) Zoonotic events; (11) Food safety; (12)			
	Chemical events; (13) Radionuclear emergencies.			
Universal health coverage	Percentage of tracer indicators in the UHC service	2013-	https://www.who.int/data/gho/data/ind	2020/05
(UHC) index	coverage index with primary country data sources	2017	icators/indicator-details/GHO/data-	/22
	between 2013-2017.		availability-for-uhc-index-of-essential-	
			service-coverage-(-)	
Hospital beds (n) per 10,000	Number of hospital beds available per 10,000 inhabitants	2004-	https://www.who.int/data/gho/data/ind	2020/05
population	in a population.	2015	icators/indicator-	/22
			details/GHO/hospital-beds-(per-10-	
			000-population)	

<b>day</b> 2020/05
2020/05
/22

Covariates	Definition / Description / Information source	Years	URL	Access
				day
Nursing midwifery (n) per	Number of nursing and midwifery personnel includes	2013-	https://www.who.int/data/gho/data/ind	2020/05
10,000 population	nursing personnel and midwifery personnel in the given	2018	icators/indicator-	/22
	national and/or subnational area. Depending on the		details/GHO/nursing-and-midwifery-	
	nature of the original data source, it may include practicing		personnel-(per-10-000-population)	
	(active) nursing and midwifery personnel only or all			
	registered nursing and midwifery personnel The ISCO -08			
	codes included here are 2221, 2222, 3221 and 3222.			
Total expenditure on health	Level of total expenditure on health (THE) expressed as a	2014	https://www.who.int/data/gho/data/ind	2020/05
as a percentage of GDP (%)	percentage of gross domestic product (GDP).		icators/indicator-details/GHO/total-	/22
			expenditure-on-health-as-a-	
			percentage-of-gross-domestic-	
			product	
Population with household	Proportion of the population with household expenditure	1993-	https://www.who.int/data/gho/data/ind	2020/05
expenditures on health	on health exceeding 10% of total household expenditure	2018	icators/indicator-	/22
greater than 10% of total	or income.		details/GHO/population-with-	
household expenditure or			household-expenditures-on-health-	
income (%)			greater-than-10-of-total-household-	
			expenditure-or-income-(sdg-3-8-2)-(-)	